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The Festivos

V. 39-41

2007-2009





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Annual dues are payable to San Diego Shell Club.
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Overseas (air mail):\$30.00; Mexico/Canada (air mail):\$20.00.

Address all correspondence to the San Diego Shell Club, Inc.,
c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111. USA.

The Festivus is published monthly except December.
The publication date appears on the masthead above.
Single copies of this issue: \$5.00 plus postage.

Meeting date: third Thursday, 7:30 PM,
Room 104, Casa Del Prado, Balboa Park, San Diego

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PROGRAM

THE PINK ABALONE AT POINT LOMA

Cynthia Cotton, a graduate student at Scripps Institution of Oceanography, will speak about her work on *Haliotis corrugata* and *Astraea undosa* at Pt. Loma. She will discuss their feeding, population and habits.

Meeting date: January 18, 2007

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CLUB NEWS

Minutes of the San Diego Shell Club Meeting November 16, 2006

The meeting was called to order at 7:45 p.m. by President Bill Schneider. Minutes of the October meeting were accepted as published in *The Festivus*. Treasurer Silvana Vollero reported continued financial soundness, and reminded members of their 2007 club dues. Vice President John LaGrange's plans for next month include a talk on pink abalone. Librarian Marilyn Goldammer noted that books and reprints were again being offered for sale on the back tables. Botanical Society Representative Wes Farmer called attention to the new chairs in our meeting room. Christmas Party Chairman Jules Hertz reminded members of the upcoming Christmas Party on December 2nd. Red wine will be provided by John Jackson, and there will be a program presented by Richard Herrmann. Wrapped shell gifts will be exchanged.

New officers for 2007 were elected by acclamation: President, John LaGrange; Vice President, Carole Hertz; Treasurer, Silvana Vollero; Corresponding Secretary, Marilyn Goldammer; and Recording Secretary, Nancy Schneider. The slate will be installed at the Christmas Party.

Vice President LaGrange introduced the evening's program, presented by members who shared their shells and the stories surrounding them. Some showed their very first finds—the shells that stimulated their interest in this subject we all find so fascinating. Bruce Kemp related his tale of diving for huge *Cassis*, and he brought the largest one to show. An enormous pendant, set with endemic *Cypraea*, was given to John LaGrange by the governor of Easter Island; the accompanying story was as good as the pendant. Everyone was overawed at the huge, shiny *Cypraea* that Ron Deems showed off—until he told us that it was a wood carving. Jules' Antarctica micro *Epitonium* was later traded for an expensive and rare species from Galapagos. John Bishop's shell finds from the upper Gulf of California turned out to be a Caribbean species; he is still trying to figure out how they got there. Larry Catarius and friend dove for twenty-nine years off Santa Barbara, resulting in a great variety of *Pecten diegensis*. Bill Schneider brought a photo of his antipatharian coral embedded with the rare *Rhizochilus*, which was caught by hook and line and refuses detachment. Finding fossil ammonites from 65

mya is what piqued the Schneider's interest in shells and led to their joining the shell club. Wes Farmer demonstrated how to construct a Dorid nudibranch utilizing plastic clay. This brought back his memory of finding his first nudibranch in San Diego Bay when he was a boy in Junior High School. He also showed some of his beautiful finished models.

The shell drawing was won by Marilyn Goldammer. The meeting was adjourned at 8:50 p.m. Coffee table snacks were provided by Carole Hertz and Silvana Vollero, while great photos from last April's Shell Auction were being shown as a PowerPoint presentation by Wes Farmer.

Nancy Schneider

The Club's Annual Christmas Dinner Party Saturday evening, December 2nd

On Saturday evening December 2nd the Club hosted its annual Christmas Dinner Party at the Butcher Shop on Kearny Villa Rd in San Diego. It was a fun time. Tables were decorated with poinsettia in Strombus shells provided by the Pisors. And the wine on the tables was donated by John Jackson – both gifts much appreciated.

MC Carole Hertz got the evening going promptly at 7:00 p.m. with a few stories before the dinner. Everyone enjoyed the meal and their companions at the tables. Before dessert Carole told that this was the 45th anniversary year of the Club and the 37th year of continuous publication of *The Festivus*. Then after a few more "stories" President Bill Schneider thanked his board and the new board for 2007 was installed (See Minutes). It was then dessert time – which seems to be the highlight of every Club meal. Following dessert, Richard Herrmann gave another of his terrific programs – his first to the Club done digitally. His wonderful photos of blue whales, balls of krill, sharks etc. accompanied by his lively narrative was greatly appreciated. The evening ended with the traditional gift exchange and the lingering of attendees who were having too enjoyable a time to want to leave.

Dues are Overdue

It is time to pay your dues if you haven't already done so. If your dues are not received this month, this will be your last issue.

NEW EL SALVADOR DISTRIBUTIONAL RECORD FOR
SOLENOSTEIRA ANOMALA (REEVE, 1847)
(MOLLUSCA: BUCCINIDAE)

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A *Solenosteira* specimen was taken by Kirstie L. Kaiser using SCUBA in March 2001 while on the Smithsonian Tropical Research Institute El Salvador Expedition aboard the R/V Urracá. The crabbed, 47.8 mm shell (Figure 1) was found at a depth of five meters among boulders covered with fine sand and gorgonians at Isla Meanguera in the Golfo de Fonseca. The unusual specimen is more rounded and has more broadly rounded axial ribs than any of the *Solenosteira* spp. figured by Keen (1971). We believe Figure 1 (herein) to be a specimen of *Solenosteira anomala* (Reeve, 1847). Hernández (1992) in his preliminary survey of marine mollusks of El Salvador reported neither *S. anomala* nor the closely related *S. pallida* (Broderip & Sowerby, 1829). Therefore this is the first report of *S. anomala* in El Salvador.

Pyrula anomala Reeve, 1847, was originally described as follows: "Shell solid, somewhat fusiform, whorls transversely grooved and striated, swollen in the middle, longitudinally plicated and noded; columella umbilicated; lip serrated; yellowish-white." Reeve figured two syntypes (*Pyrula*, pl. 3, Species 9, 12). The first of which (Species 9) as Figure 2 herein, is more elongate and (Species 12) the second syntype (Figure 3 herein), which he considered to be "the more characteristic illustration of the species." looks nearly

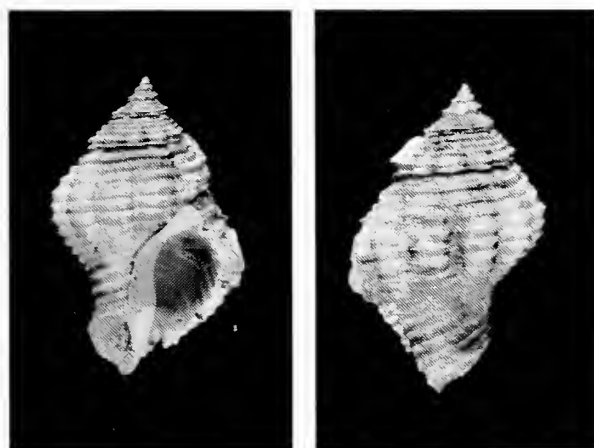
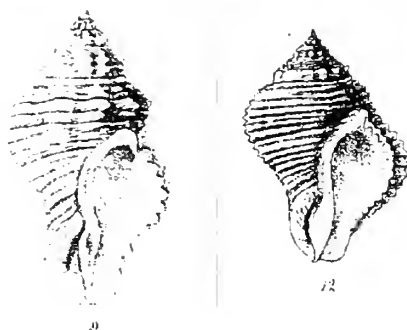


Figure 1. *Solenosteira anomala* Reeve, 1847, two views of a 47.7 mm shell, collected crabbed using SCUBA, from El Salvador in March 2001. Leg. K.L. Kaiser. Photos: P. Sadeghian.

identical to the Kaiser specimen shown in Figure 1. It is a rounder, sturdier looking specimen than that figured in Keen (1971). Keen (1971, fig. 1117) is a syntype of *Solenosteira anomala* (taken from Reeve's Species 9) which is in the British Museum. According to Keen (1971) the second syntype (Species 12) "seems to have been lost." She described *S. anomala* as "relatively slender, with strong spiral cords and a pinched-in

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Figures 2 & 3. *Pyrula anomala* Reeve, 1847 syntypes. (2, left) Reeve's Species 9; (3, right) Reeve's Species 12.

groove below the suture; the siphonal fasciole is large and the interior canal well developed; two or three of the spiral cords are stronger than the rest, but they do not stand out as peripheral nodes." She was basing her diagnosis on Reeve's Species 9. Reeve's Species 12 is what we consider to be the usual form of *Solenosteira anomala*.

The genus *Solenosteira* (Dall, 1890), has as its type species by original designation, *S. anomala* Reeve. The distribution for *S. anomala* is listed in Keen (1971) as "Baja California southward, possibly to Ecuador, intertidally and offshore to depths of 73 m." Pilsbry & Olsson (1941) list *S. anomala* as occurring on the coast of Ecuador and northern Perú. Olsson & Harbison (1953) list the distribution of *S. anomala* as Pacific coast of northwestern South America.

Searches of the Santa Barbara Museum of Natural History Collection revealed some lots of *Solenosteira anomala* (SBMNH 37681, 8573, 24634, 9871, 369348, 28342 and some unnumbered lots). They were from México, Costa Rica, Ecuador and Perú. One specimen collected by shrimpers out of Salina Cruz, Oaxaca, México (SBMNH 369348) is shown here as Figure 4.

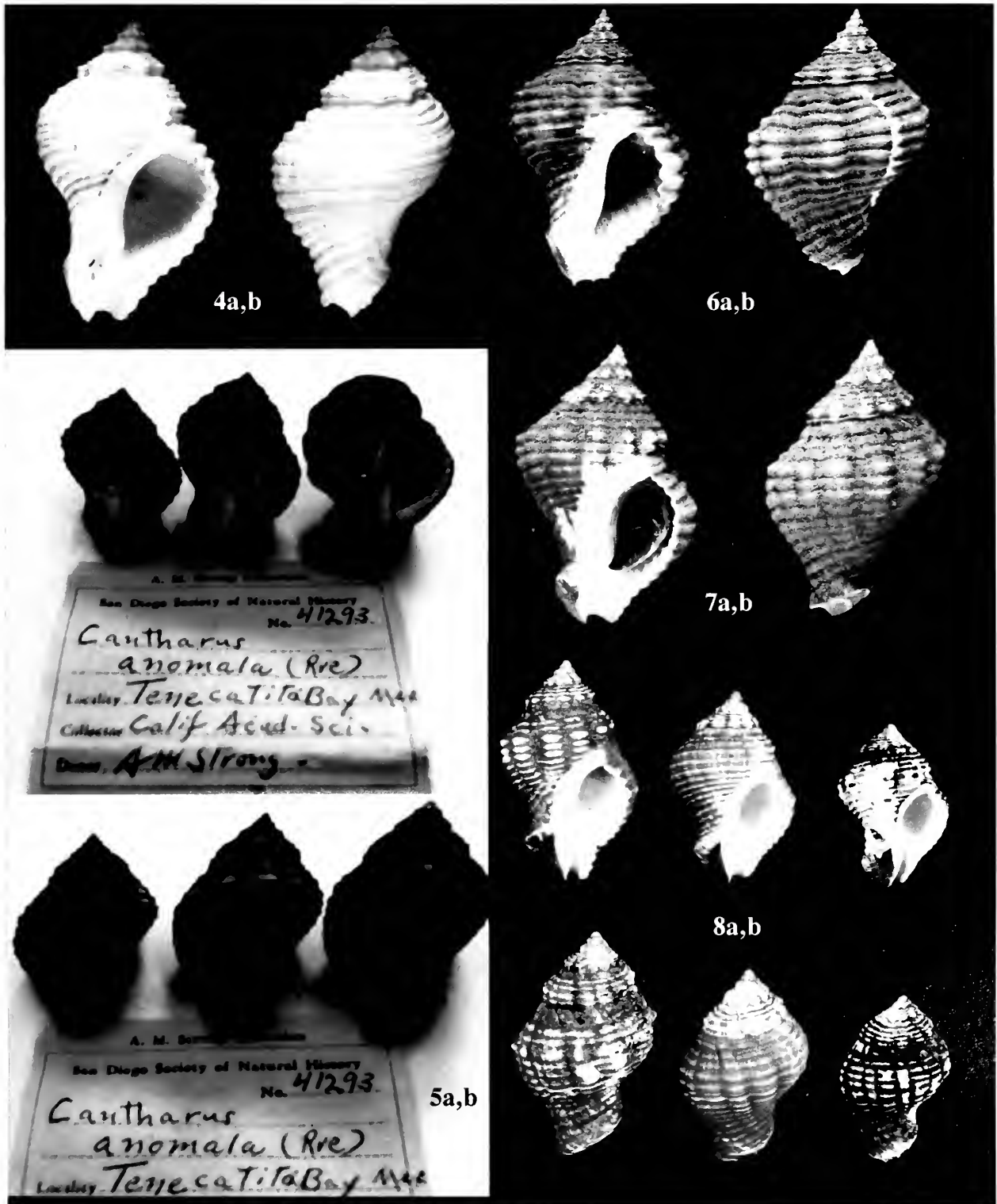
Three lots were also found at the San Diego Natural History Museum which were originally identified as *S. pallidus* (Broderip & Sowerby, 1829) (SDNHM 41293, 19052, 51811) and one of those lots from Bahía Tenacatita, México, is shown here as Figure 5. Carol Skoglund of Phoenix, Arizona, has three lots in her collection which have the very distinctive rounded appearance and heavy axial ribs of the El Salvador specimen. These specimens, between 24 to 67 mm in height (Figures 6-8), came from off the tip of Baja California Sur, Bahía Santiago, Colima, México, and Playas de Villamil, Guayas, Ecuador. The largest specimens are very heavy and most have a tightly adhering dark brown periostracum.

Abbott (1974) has *S. anomala* (Reeve, 1847), as a form of *Cantharus pallidus*, a quite variable, common species from intertidal regions to 20 fathoms. Keen's lectotype figure of *Solenosteira pallida* (1971, fig. 1123) is a much more slender shell with a higher spire and more angular periphery than seen in *S. anomala*. The specimen figured is from the type lot in the Gray collection in the British Museum.

There are two species in the fossil record that look somewhat like *S. anomala* (Reeve, 1847). *Hanetia boggsi* (Pilsbry & Olsson, 1941 pp. 28, 29, pl. 5, figs. 3,4) is very similar but is distinguished by more numerous axial ribs, there being 15 to 17 on the last whorl, while *S. anomala* usually has 9 to 11; the shoulder of the body whorl is rounded, the ribs small and crowded. *Hanetia dalli* (Brown & Pilsbry, 1911) was figured by Olsson (1964) and this species also looks similar to *S. anomala*.

This small study has demonstrated the great variability within the many species of *Solenosteira* and emphasizes the need for an in-depth or monographic examination of the group.

Figures 1-8. (1a,b) *Solenosteira anomala* (Reeve, 1847). H=47.7 mm, apertural and dorsal views, collected crabbed using SCUBA, from El Salvador in March 2001. Leg. Kirstie L. Kaiser. K.L. Kaiser Collection. Photo: P. Sadeghian. (2) *Pyrula anomala* Reeve, 1847. Syntype from Reeve, 1847, pl. 3 (*Pyrula* Species 9). (3) *Pyrula anomala* Reeve, 1847, syntype from Reeve, 1847, pl. 3 (*Pyrula* Species 12). (4a,b) *Solenosteira anomala*. SBMNH 369348, H= 38 mm, apertural and dorsal views, collected by shrimpers out of Salina Cruz, Oaxaca, México, trawled 1970, via Margaret Suzanne Cunningham 1984, ex Shy Collection. Photo: P. Sadeghian. (5a,b) *Solenosteira anomala*. SDNHM 41293, 3 specimens, H= 32.5-45.3 mm, apertural and dorsal views, Bahía Tenacatita, México. Photo: C.M. Hertz. (6a,b) *Solenosteira anomala*. H= 33.3 mm apertural and dorsal views, Bahía Santiago, Colima, México, dredged 8-20 m, on mud bottom, August 1975. Leg. Paul & Carol Skoglund. Photo: P. Sadeghian. (7a,h) *Solenosteira anomala*. H= 42.3 mm, apertural and dorsal views, trawled by shrimpers between Isla Cedros and La Paz, Baja California, México, Leg. A. Luna, February 1975, Skoglund Collection. Photo: P. Sadeghian. (8a,h) *Solenosteira anomala*. 3 specimens, H= 49.1-66.0 mm, apertural and dorsal views, trawled by shrimpers off Playas de Villamil, Guayas Province, Ecuador, 1980, via Bill & Liz Thorp, Skoglund Collection. Photo: P. Sadeghian. →



Acknowledgments

The authors thank Carol Skoglund for her loan of specimens and her critical reading of earlier drafts of the paper; Carole Hertz for her photography and editorial help; Patricia Sadeghian of the Santa Barbara Museum of Natural History (SBMNH) for photographing many of the specimens figured herein; and D. Ross Robertson of the Smithsonian Tropical Research Institute (STRI) and the Captain and crew of RV Urracá for support of collecting mollusks in the waters off El Salvador.

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A New Part to the Conchological Iconography – Pectinidae now available

The following information was just released by Donald Dan: December 17, 2006

CONCHOLOGICAL ICONOGRAPHY - Part 12, Family Pectinidae by Raines, B.K. & G.T. Poppe
Loose leaf, punched for 4-hole binder.

Price, US \$375 (based on today's exchange rate of \$1.30 per Euro) plus 2 binders, \$28

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"This is an up-to-date comprehensive reference for this very large family. The volume comprises two sections, a 402-page section of text and black and white illustrations and a 320-page section of color plates. The b/w section has 143 text-plates with 1,354 photos and 242 maps. The color plate section has 2,015 photos, including 26 showing live animals and 268 photos as identification tools."

Contact Donald Dan, 6704 Overlook Drive, Fort Myers, FL 33919, USA.

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E-mail: Donaldan@aol.com

BOOK NEWS: REVIEW OF TWO GUIDES TO WESTERN MEXICAN
AND CENTRAL AMERICAN OPISTHOBRANCHS,
WITH BIOGEOGRAPHIC AND SUPRA-FAMILIAL TAXONOMIC
COMMENTS

HANS BERTSCH

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Camacho-García, Yolanda, Terrence M. Gosliner, and Ángel Valdés. 2005.

Guía de Campo de las Babosas Marinas del Pacífico Este Tropical / Field Guide to the Sea Slugs of the Tropical Eastern Pacific. California Academy of Sciences, San Francisco, CA. 129 pp. ISBN 0-940228-63-7.

Hermosillo, Alicia, David W. Behrens, and Eduardo Ríos Jara. 2006.

Opisthobranchios de México: Guía de Babosas Marinas del Pacífico, Golfo de California y las Islas Oceánicas. CONABIO and Universidad de Guadalajara, México. 143 pp. ISBN 970-27-0868-0.

There can never be enough nudibranch books! Including the recent *Eastern Pacific Nudibranchs* (Behrens & Hermosillo, 2005), which updated *Pacific Coast Nudibranchs* (Behrens, 1980 and 1991), we now have three excellent field guides to the opisthobranch fauna of the northeastern Pacific along the American coasts, from Alaska to Perú. Each of these books is unique, distinguished from each other by different photographs and descriptive and introductory text. They are complementary to each other. Combined they represent the most comprehensive presentation of illustrative and written information about opisthobranch biodiversity, variation and natural history for any faunal regions worldwide. If a person had to choose just one, I could only recommend that all three be purchased, read, and used in the field or at the desk. Behrens & Hermosillo (2005) has already been reviewed (Bertsch, 2006), so this review presents the works of Camacho-García *et al.*, 2005, and Hermosillo *et al.*, 2006.

In the interests of editorial disclosure, it must be stated that I know personally, both as friends and colleagues, all six of the authors (some for over 30 years!). However, they know me well, and know that I would honestly say if I did not like (or disagreed with) their work. Nevertheless, these two books provide patent

evidence for the esteem and respect in which I hold and value their science and friendship.

Guía de Campo de las Babosas Marinas del Pacífico Este Tropical (CGGV) is bilingual. The Spanish and English text (excepting the Identification Keys) are printed on the same page, which enables the reader to review the material rapidly in either language.

Dichotomous identification keys (Span., pp. 32-42; Eng., pp. 43-53) form a substantial portion (15%) of the pagination. The ordinal/subordinal key leads one to the 10 individual species-level keys for Acteonids and Cephalaspideans, Sacoglossans, Anaspideans, Tyloidinids, Pleurobranchids, Dorids (=Cryptobranchs), Phanerobranch Dorids, Arminids and Janolids, Dendronotaceans, and Aeolids.

The informative introduction (illustrated with anatomical line drawings, color photographs and SEMs) explains opisthobranch external morphology, anatomy, natural history and physiology, defense, biogeography, importance and usage (referencing the Nobel prize-winning research of Eric Kandel on *Aplysia* nervous systems), and collecting methods.

Species' descriptions follow the 3-species-per-page boiler-plate standard established in the Sea Challengers natural history guide books, most with the sections Size,

Morphology, Natural History, and Geographic Range. Some species' texts include Etymology (almost in a random appearance); very rarely are Remarks given. Common names are given in both English and Spanish.

By far the majority of the photos (primarily taken by Terrence M. Gosliner) are portrait-style "tub shots," expertly lit, in focus, and showing the animals' complex colors and shapes. With the exceptions of the chromo-variable *Cyerce ortei* (and egg mass), *Taringa aivica*, *Flabellina telja*, *F. marcusorum*, and *Phestilla lugubris*, all species have one identifying full-color photograph. I confess to hesitation in accepting the labelled "*Glossodoris baumanni* juvenil" (page 81), and suggest it is most probably a juvenile *Chromodoris sphoni*. One particularly compelling series were black-and-white apertural-view photos of the animal-less shells of Acetonids, *Atyis*, and *Julia*. Several specimens bear radular bore holes, suggesting that the sandy environs support gastropod predators on those opisthobranchs (*s.l.*) which are still confined to the plesiomorphic use of the shell for defense.

Opisthobranchios de México (HBRJ) is a visually stunning presentation of the intimacies of 234 species of "babosas marinas." Its illustrative variety, bold layout and comprehensive text emphasize the dynamism of opisthobranch evolutionary ecology. Nudibranchs (used synecdochically) are all dressed up for their own Mardi Gras. Even the perfunctory title pages, dedication, credits, table of contents and preface are gloriously enhanced with vibrant photos of these "butterflies of the seas" cavorting in their search for food or sex. Yahweh might have made the Great Whales for His amusement" (Psalm 104), but he subcontracted the marine slugs to the natural selection team of Van Gogh, Giotto and Gauguin.

The introduction describes and copiously illustrates their forms and colors, commercial importance, feeding and the radula, sensory organs and rhinophores, respiration, reproduction (with an entire page of photos of nudibranchs *in flagrante delicto* and of their egg masses), collection, preservation and identification (all stages of the process are photographed), and biogeography (including a full page of mini-photos of various habitats). A section on nomenclature terminology, derivation and symbols, "How to Use This Book," and an illustrated glossary follows.

Species' description categories (again following the Sea Challengers template) are external morphology, radular formula, natural history, size, geographic distribution, and etymology. Spanish common names are given.

Nearly all photographs were taken in situ by Alicia Hermosillo. Quite frequently the egg mass and/or prey item are included in the underwater image and multiple shots of the species reveal a range of coloration differences, behavioral activities or substrate occurrences. The jumps-out-at-you photograph (p. 10) of *Tambja abdere* on its prey bryozoan *Sessibugula* is definitely a self-proclamation of nudibranch-ness!

Today's web-based data sites provide copious amounts of nudibranch information and photographs; they also give access to "conversation" with recognized experts, photographers and aficionados. The Appendix (HBRJ, p. 143) lists web sites related to opisthobranchs. Regrettably, the URL given in the References (p. 140) to McDonald & Nybakken's list of worldwide food habits of nudibranchs is erroneous; it should be: http://theveliger.org/nudibranch_food.html.

These two excellent faunal guides complement each other. The geographic areas of coverage are allopatric: HBRJ covers the fauna occurring along the Pacific and Sea of Cortez Mexican coasts, and at the territorial offshore islands (map, p. 11). CGGV describes the more southerly tropical eastern Pacific, from the border of México-Guatemala to the Perú-Chile border and the Islas Galapagos, with major collecting efforts in Costa Rica.

Given the different zoogeographic provinces covered (the temperate Californian and the tropical Panamic provinces, which includes a subtropical division, and the distinct regions of the Gulf of California, and the west coasts of Mexico, Central and South America), the same species are not included in both books. CGGV presents 163 species, 115 named, 48 unnamed (29%) without binomials but identified to genus; HBRJ includes 234 species, 204 named, 30 unnamed (13%). Of these, 8 unnamed and 83 named species occur in both books. Hence the total fauna identified for the combined range of coverage in these works is 305 species, of which 69 (22.6%) are unnamed. *Eastern Pacific Nudibranchs* (BH) reports 314 species, which includes 277 named and 37 unnamed (12%), from Alaska to Central America. The coverage of BH adds the cold water Alaskan and Oregonian provinces; it has 80 species (9 unnamed and 71 named) not found in CGGV and HBRJ. Therefore, based on the data presented in these three books, the opisthobranch fauna of the west coast of the Americas, from Alaska to southern Perú (excluding several *Philine* spp., and the bathyal *Bathydoris aioca*), is 385 species, of which 78 are unnamed (20%), and 307 named. The highest percentage of unnamed species occurs in the southern

portion of the Panamic Province, reflecting the different amounts of research activity in these areas. A full analysis of these biogeographic data is warranted (Bertsch, in prep.).

Higher level opisthobranch taxonomy is in flux. Not even suffixes are consistent. In CGGV (see p. 27) a glaring lack of stating of Categorical ranks occurs above the Family level. “*Heterobranquios superiores*, Higher Heterobranchs” appears to be placed at the same level as the traditional Orders Cephalaspidea, Sacoglossa, Anaspidea and Nudibranchia, but none are so labelled. Tyrodinoidea and Pleurobranchomorpha (certainly Pleurobranchioidea is preferable and correct, as CGGV themselves use on pages 30, 36, and 47; see also Vonnemann *et al.*, 2005) are likewise typographically within the Order position, but again without proper indication of category. This separation of the Notaspidea into two clades is in complete agreement with recent work by Wägele & Willan (2000) and Vonnemann *et al.* (2005), who introduce and use Nudipleura, and with their own (CGGV) phylogenetic lineage.

Let me comment on their significant diagram (CGGV, p. 7) which shows the main opisthobranch lineages organized according to their evolutionary history. The apical branches are all Orders, although this designation is not stated; the formerly-standard 5 are divided into 7, with the additions of “*Heterobranquios superiores*/Higher Heterobranchia” and the two former subsets of “Notaspidea,” “*Tyrodinoideos*/Tyrodinids” and “*Pleurobranchioideos*/Pleurobranchids” (note the latter is not “*Pleurobranchomorfideos*/Pleurobranchomorphs”). The points of basal origin of the tree and the horizontal bars indicate major evolutionary synapomorphies, which are used to define nomenclatural rankings or clades. The placement of this figure's upper title is confusing regarding taxa included in Subclass Opisthobranchia. Does this clade include everything above the base of the tree (as indicated by the length of the line under “Opisthobranquios/Opisthobranchs”), or from above the first horizontal line in the tree? The latter is most probable, since based on Mikkelsen's (1996) phylogeny, Higher Heterobranchs/Acteonids are not opisthobranchs.

Does the named taxon Nudipleura include the two branches above the second-from-the-top horizontal bar? What is its category rank? Would we need the other Order-level clades positioned in different similarly ranked taxa? The logical phylogenetic consequence of this relationship ranks both Tyrodinoidea and Pleurobranchioidea as separate opisthobranch Orders,

with the Pleurobranchioidea and Nudibranchia monophyletically included within Nudipleura.

Of the traditionally recognized 4 suborders of Nudibranchia, *Arminina* is paraphyletic (CGGV, pp. 29, 31, 39 and 50; HBRJ, p. 108; BH, p. 100; Wägele & Willan, 2000, pp. 170-171). Accepting this establishes 2 monophyletic subordinal level clades: Arminina and either Janolina [?], or Zephyrinina [?], or Proctonotina [?]. (Note: [?] indicates name priority not determined.)

The Family is spelled Arminiidae (HBRJ and BH) and Arminidae (CGGV), this latter probably being the correct orthography.

CGGV (pp. 28-29, and 31) utilize 5 Suborders, without a Categorical rank, but spell each 2 different ways: Doridacea (Doridoidea), Dendronotacea (Dendronotoidea), Arminacea (Arminoidea), Janolidacea (Janolidoidea), and Aeolidacea (Aeolidoidea). HBRJ and BH use the 4 Suborders Doridina, Dendronotina, Arminina, and Aeolidina. CLEMAM's taxonomic data base on European Marine Mollusca (2006: www.somali.asso.fr/clemam/biotaxis.php) places Proctonotidae within Unassigned Nudibranchia (the janolid group), and uses the spellings Doridina, Dendronotina, Arminina, and Aeolidiina (note the double “i”). Only one of the three suffix spelling alternatives should be used.

Science advances with the known and the unknown. Discovery allows us to ask where our search can continue. *Guía de Campo de las Babosas Marinas del Pacífico Este Tropical* and *Opistobranquios de México* are magnificent clarion calls, challenging us with their comprehensive presentations to keep observing, caring for and protecting the denizens and habitats of the ocean.

Beauty of the Beasts: flailing swimmers (*Flabellina cynara*), sea goddesses (*Glossodoris sedna*), slimy slugs (*Tambja abdere*), singing lion kings (*Hermosita hakunamatata*), fathers' pride (*Favorinus elenalexium*), and even a sour apricot slug (*Berthellina ilisima*). These and hundreds of other opisthobranchs are spectacularly illustrated and authoritatively described in these two guide books. Thanks to the efforts of Yolanda, Terrence, Ángel, Alicia, David and Eduardo, tropical eastern Pacific *babosas marinas* have never looked better—well, except when you discover them underwater!

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LOW TIDES FOR 2007 AT SAN FELIPE, BAJA CALIFORNIA, MÉXICO

The entries below show periods of low tides of -3.90 feet and below. The times of low tides are given in Pacific Standard Time, except those dates marked with an asterisk are in Pacific Daylight Time. To correct for

Puerto Peñasco add one hour to listed times when they are in Pacific Standard Time. Tides below the midriff of the Gulf cannot be estimated using these entries. All entries are approximate times and tides.

Jan 18	8:02 p.m.	-4.16 ft	Apr 17	9:03 a.m.*	-5.46 ft	Sept 26	9:02 p.m.*	-4.71 ft
Jan 19	8:39 p.m.	-4.66 ft	Apr 18	9:38 a.m.*	-5.30 ft	Sept 27	9:20 a.m.*	-4.30 ft
Jan 20	9:17 p.m.	-4.48 ft	Apr 19	10:15 a.m.*	-4.34 ft	Sept 27	9:35 p.m.*	-5.02 ft
Feb 16	7:51 p.m.	-4.96 ft	May 15	8:01 a.m.*	-4.65 ft	Sept 28	10:10 p.m.*	-4.56 ft
Feb 17	8:27 p.m.	-5.50 ft	May 16	8:41 a.m.*	-5.09 ft	Oct 24	8:00 p.m.*	-4.66 ft
Feb 18	9:04 p.m.	-5.16 ft	May 17	9:20 a.m.*	-4.81 ft	Oct 25	8:35 p.m.*	-5.56 ft
Feb 19	9:41 p.m.	-3.92 ft	June 14	8:29 a.m.*	-4.15 ft	Oct 26	9:11 p.m.*	-5.66 ft
Mar 17	7:32 p.m.	-4.89 ft	June 15	9:12 a.m.*	-4.06 ft	Oct 27	9:49 p.m.*	-4.95 ft
Mar 18	7:57 a.m.	-3.97 ft	July 30	9:22 a.m.*	-3.96 ft	Nov 22	6:36 p.m.	-4.54 ft
Mar 18	8:09 p.m.	-5.21 ft	July 31	9:58 a.m.*	-4.07 ft	Nov 23	7:16 p.m.	-5.33 ft
Mar 19	8:30 a.m.	-4.81 ft	Aug 27	8:30 a.m.*	-4.08 ft	Nov 24	7:57 p.m.	-5.41 ft
Mar 20	8:46 p.m.	-4.60 ft	Aug 28	9:04 a.m.*	-4.79 ft	Nov 25	8:39 p.m.	-4.76 ft
Mar 20	9:03 a.m.	-4.90 ft	Aug 29	9:40 a.m.*	-4.72 ft	Dec 22	7:09 p.m.	-4.47 ft
Mar 21	9:38 a.m.	-4.20 ft	Sept 25	8:07 a.m.*	-4.11 ft	Dec 23	7:53 p.m.	-4.81 ft
Apr 16	8:28 a.m.*	-4.81 ft	Sept 26	8:43 a.m.*	-4.63 ft	Dec 24	8:36 p.m.	-4.56 ft



THE FESTIVUS

A publication of the San Diego Shell Club

ISSN 0738-9388

Volume: XXXIX February 8, 2007 Number: 2

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Annual dues are payable to San Diego Shell Club.
Membership (includes family). Domestic \$20.00;
Overseas (air mail):\$30.00; Mexico/Canada (air mail):\$20.00.

Address all correspondence to the San Diego Shell Club, Inc.,
c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111, USA.

The Festivus is published monthly except December.
The publication date appears on the masthead above.
Single copies of this issue: \$5.00 plus postage.

Meeting date: third Thursday, 7:30 PM,
Room 104, Casa Del Prado, Balboa Park, San Diego

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PROGRAM

SEASHELLS AND THEIR FRIENDS

Bob Yin, award-winning underwater photographer and author, will give a presentation of his beautiful images of mollusks and other marine life taken in exotic sites in many parts of the world.

Meeting date: February 15, 2007

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CLUB NEWS

Minutes of the San Diego Shell Club Meeting January 18, 2007

The meeting was called to order by President John LaGrange at 7:45 p.m. The minutes of the previous meeting were accepted as printed in *The Festivus*. Carole Hertz revealed the date of the upcoming Auction: April 28. Librarian Marilyn Goldammer presented up-to-date Library Lists for those attending the meeting. Carole announced that SCUM would be meeting across the street, at the San Diego Natural History Museum, on Saturday beginning at 8 a.m. Wes Farmer has secured our meeting room for not only year 2007, but also 2008. *The Festivus* has articles ready through March.

Carole announced that Twila Bratcher Critchlow has died. She and her sister, Billee Gerrodette have traveled the world together and collected shells from exotic places. Now the donation of their collections is enhancing our Annual Auction.

The speaker of the evening, Cynthia Catton Button, was introduced by John LaGrange. As a graduate student at Scripps Institution of Oceanography, she is entitling her thesis Population Biology of Two Broadcast-Spawning Gastropods. Within a 9-hectare box off Pt. Loma, she is studying population dynamics of *Haliotis corrugata* and *Astraea undosa*. Although California Fish & Game estimates a necessary spawning population density of 2,000 individuals per hectare, in reality there are only about 100 of the abalone per hectare. A moratorium has been placed on abalone in 1998 due to its decline. Because of the abalone's sedentary existence, an aggregation is necessary for broadcast spawning to take place. *Astraea undosa* and *H. corrugata* have similar life histories, but the turban

is mobile and extremely abundant at the Pt. Loma management of the fishery. Much discussion followed her presentation.

The meeting was adjourned at 8:55 p.m. Coffee and cookies provided by John LaGrange and Nancy Schneider were enjoyed by all.

Nancy Schneider

The Annual Auction/Potluck April 28, 2007

The date has been set and the place has been secured for the Club's Annual Auction/Potluck. For the 17th consecutive year, Wes Farmer will be hosting this affair at the community room at his condo. It is the perfect place, he is the perfect host and – do we have shells for you!!

Two weeks ago, members of the board assembled for a day to work on the shells for the auction and many fantastic specimens have been selected for the voice auction, with great buys for the silent auction and the \$1-table.

As a bit of a teaser, we might mention that there are some very special shells such as: *Cypraea ostergaardi* Dall, 1921; *Haliotis dalli* Henderson, 1915; *Strombus taurus* Reeve, 1857, and *Boreotrophon bentleyi* (Dall, 1908) that are awaiting new homes.

Save the date and remember that festivities begin at 5:00 p.m. for relaxing fluid, socializing and browsing the shells for the voice auction and the silent auction tables. Dinner is at 6:00 p.m. and the voice auction begins promptly at 7:00 p.m. A map will be included with the April issue.

Hope to see you there!

IN MEMORIAM

Twila Bratcher Critchlow

November 29, 1911 - December 25, 2006

It is with sadness that we report the passing of Twila Bratcher Critchlow. She has gladdened the lives of all who knew her and has contributed greatly to the field of malacology. *The Festivus* is preparing a special issue in tribute to Twila.

RESULTS OF DEEP-WATER DREDGING IN THE GULF OF MEXICO USING THE "BENTHIC SKIMMER"; AND REPORT ON SEVERAL GEOGRAPHIC EXTENSIONS, INCLUDING TWO SPECIES NOT PREVIOUSLY REPORTED IN THE WESTERN ATLANTIC

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In July 2006, members of the Biology Department at the University of Louisiana at Lafayette led a group of marine biologists on a dredging expedition to the Gulf of Mexico. The area to be sampled extended from off the Louisiana coast to Tampa, Florida.

Although there were several standard dredges available that had been used before in relatively shallow water, this time the plans called for sampling much deeper water where regular dredges would not work properly because of the very soft sediment that covered the bottom. For this purpose, a dredge was built following the exact design of the Benthic Skimmer, a dredge deployed in the late 1960s by Pequegnat et al. (1970) to study the benthic fauna of the Gulf of Mexico. The research vessel used by our expedition was the *R/V Pelican*, operated by LUMCON (Louisiana Universities Marine Consortium) with its homeport in Cocodrie, Louisiana.

The Benthic Skimmer has the general shape of a capital I (Figure 1). It is larger than most dredges used by research vessels, having a frontal gape of 3 m, a length of 3.66 m, and a "tail" width of 1.8 m. The three-meter opening increases the probability that a reasonable quantity of specimens are collected.

The Benthic Skimmer was designed to be sufficiently heavy to permit rapid lowering and fast tows, as well as strong enough to remain intact on adverse substrates. Very important objectives were also the collecting of delicate marine life that would reach the surface in good condition, as well as long hauls, up to four hours, that would bring up a dredge relatively free of sediment. By using only twice the length of cable as there was depth, rather than the standard triple length, the dredge was prevented from digging too deeply into the soft sediment.

The Benthic Skimmer was used in our expedition at five stations, ranging in depth from 600 to 2468 m. It took an average of about one hour to get the dredge down. In the first and deepest trial (2432 to 2468 m) the dredge was kept at the bottom for only one hour, as we were uncertain of its performance. However, the dredge performed without complications, free of sediment, and with a good sampling of invertebrates and fish.

The Skimmer performed even better in the other four stations, where the bottom time was two hours instead of one. The dredge came up almost totally free of sediment, which suggests that the four-hour hauls recommended by the designers seemed very plausible.

The total molluscan catch in the four stations was 28 lots comprising 24 species: 18 gastropods and 6 bivalves. Ironically, the design of the dredge had prevented the gathering of sediment and, therefore, the collection of micromollusks other than the few specimens that were entangled, by chance, in the rest of the biota.

The species collected are as follows:

(The letter "L" after a name indicates species that were collected live.)

NSF.III.25: 28°31.26'N, 87°40.64'W- Dredged in 2432-2468 m:

**Theta chariessa* (Watson, 1881) L

**Benthomangelia bandella* (Dall, 1881)

**Gemula periscelida* (Dall, 1889)

NSF.III. 26: 28°44.43'N to 28°38.3'N, 87°30.53'W to 87°30.50'W, in 1773-1699 m:

**Tindaria amabilis* (Dall, 1889) L

- **Calliotropis acninophora* (Dall, 1890) L (Figure 3)
- **Oocorys sulcata* Fischer, 1883
- **Gymnobela* cf. *chyta* (Watson, 1881) (Figure 8)
- **Leucosyrinx tenoceras* Dall, 1899 L
- **Leucosyrinx verrilli* (Dall, 1881) L
- **Pleurotomella benedicti* Verrill & Smith, 1884 (Figure 13)
- **Cylichna vortex* (Dall, 1881)

NSF.III.27: 28°58.72'N to 28°57.49'N, 87°17.59'W to 87°12.08'W in 1170-964 m:

- **Leucosyrinx verrilli* (Dall, 1881) L

NSF.III.74: 28°06.52'N to 28°07.21'N, 89°36.99'W to 89°46.57'W in 850-610 m:

- **Macoma* cf. *tenta* (Say, 1834)
- **Lucinoma* sp.
- **Cataegis meroglypta* McLean & Quinn, 1987
- **Eosipho canetae* (Clench & Aguayo, 1944) (Figure 4)
- **Volutomitra* cf. *bairdii* Dall, 1889 L (Figure 9)
- **Globidrillia smirna* (Dall, 1881) L
- **Leucosyrinx* cf. *verillii* (Dall, 1881) (Figure 12)
- **Leucosyrinx tenoceras* Dall, 1899
- **Scaphander punctostriatus* Mighels, 1841

NSF.III. 88: 27°35.22'N to 27°33.13'N, 91°52.31'W to 91°47.55'W in 600-960 m:

- **Amygdalum* cf. *politum* (Verrill & Smith, 1880) (Figure 2)
- **Cetoconcha margarita* (Dall, 1886)
- **Cuspidaria rostrata* (Spengler, 1793)
- **Gaza superba* Dall, 1891 L
- **Gregorioiscalea pachya* (Locard, 1897) (Figure 6)
- **Eosipho canetae* (Clench & Aguayo, 1944) L
- **Cosmioconcha rikae* Monsecour & Monsecour, 2006
- **Volutomitra* cf. *bairdii* Dall, 1889 L (Figure 10)
- **Olivella* sp.
- **Globidrillia smirna* (Dall, 1881) L (Figure 5)
- **Leucosyrinx subgrundifera* (Dall, 1888) (Figure 11)

Although many of the species collected are well-documented as inhabiting the Gulf of Mexico, some species deserve special comments:

Pleurotomella benedicti (Figure 13) has been reported only from the northern Atlantic Ocean (Bouchet & Warren, 1980:35, figs. 86-87). The single specimen collected is in almost pristine condition and shows all the characters of the species.

Gregorioiscalea pachya (Figure 6) has been collected in southwestern Europe and the Azores (Bouchet & Warén, 1986: 544, figs. 1254-1255). It has not been

reported from the western Atlantic. Although the single specimen was collected dead and has a broken apex, it perfectly matches the unusual characters of the taxon, as well as the specimens figured by Bouchet & Warén. Although I have said elsewhere that the differences between *Gregorioiscalea* and *Opalia* s.l. are nebulous (García, 2004:1), I follow Bouchet & Warén (1986: 544) in placing this taxon in *Gregorioiscalea*. Interestingly, a second deep-water epitoniid species, *Eccliseogyra formosissima* (Jeffreys, 1884) (Figure 7), formerly known only from off Portugal, Morocco and the Azores (Bouchet & Warén, 1986: 483, fig. 1142), has also recently been reported from the hydrocarbon vents, off the Louisiana coast (García, 2003).

Globidrillia smirna (Figure 5) has been reported from off the northwestern coast of Cuba, but has not been reported from the northern Gulf of Mexico until now. The fact that two live specimens were found at two non-consecutive stations seems to show that it is well settled in the northern Gulf.

Calliotropis actinophora (Figure 3) is a wide-spread species, occurring from Río de la Plata, Argentina, to the Florida Straits. However, it had never been reported north of 25°37' or west of 82°35' (Quinn, 1979). Three live specimens were dredged at NSF.III.26.

Leucosyrinx subgrundifera (Figure 11) had been reported by Dall (1881) as inhabiting the eastern Gulf of Mexico, between the Mississippi Delta and Cedar Key. However, this is the first report of this species for the northwestern quadrant of the Gulf of Mexico.

A single, dead specimen of *Volutomitra bairdii* had been reported (García & Lee, 2004) from the hydrocarbon vents off Louisiana. The worn specimen conforms with the holotype of the species. The three live specimens of *Volutomitra* cf. *bairdii* (Figures 9 and 10) collected on this trip have a more pronounced shoulder and heavier axial ribs than the holotype. However, they may only be ecomorphs.

Other species collected, not quite conforming with described species, may also be ecomorphs: The single specimen of *Amygdalum* cf. *politum* (Figure 2) measures 16 mm in length and 9 mm in width, with a width/length ratio of 0.56. It has a wider shell than that of *Amygdalum politum*, which has an average width/length ratio 0.43. The specimens of *Macoma* cf. *tenta* have a more rectilinear dorsal, posterior edge, and a more pointed anterior end than *Macoma tenta*. The two specimens of *Gymnobela* cf. *chyta* (Watson, 1881) (Figure 8) follow the description given by Bouchet & Warén (1980:58, fig. 110), but are more elongated than their figure and have

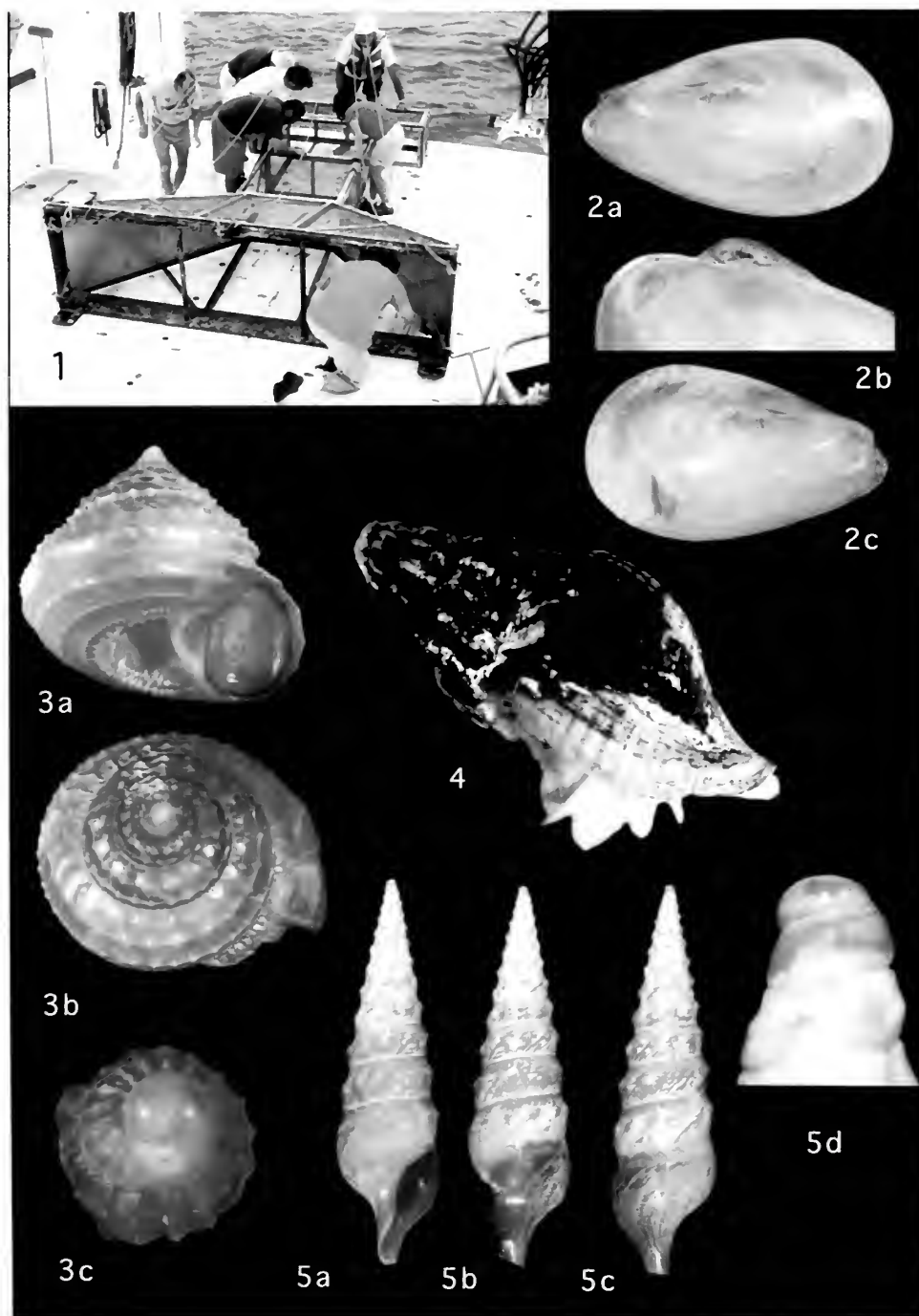


Plate I. Figures 1 - 5

1. The Benthic Skimmer. The biologists are picking the last biological material after the haul. The dredge has not been cleaned of sediment. 2. *Amygdalum* cf. *politum* (Verrill & Smith, 1880); NSF.III. 88: 27°35.22'N to 27°33.13'N, 91°52.31'W to 91°47.55'W, in 600-960 m, 16 mm. 3. *Calliotropis acinophora* (Dall, 1890); NSF.III. 26: 28°44.43'N to 28°38.3'N, 87°30.53'W to 87°30.50'W, in 1773-1699 m, 11 mm. 4. Live specimen of *Eosipho canetae* (Clench & Aguayo, 1944); NSF.III. 88: 27°35.22'N to 27°33.13'N, 91°52.31'W to 91°47.55'W, in 600-960 m. 5. *Globidrillia smirna* (Dall, 1881); NSF.III. 88: 27°35.22'N to 27°33.13'N, 91°52.31'W to 91°47.55'W, in 600-960 m, 22.5 mm.

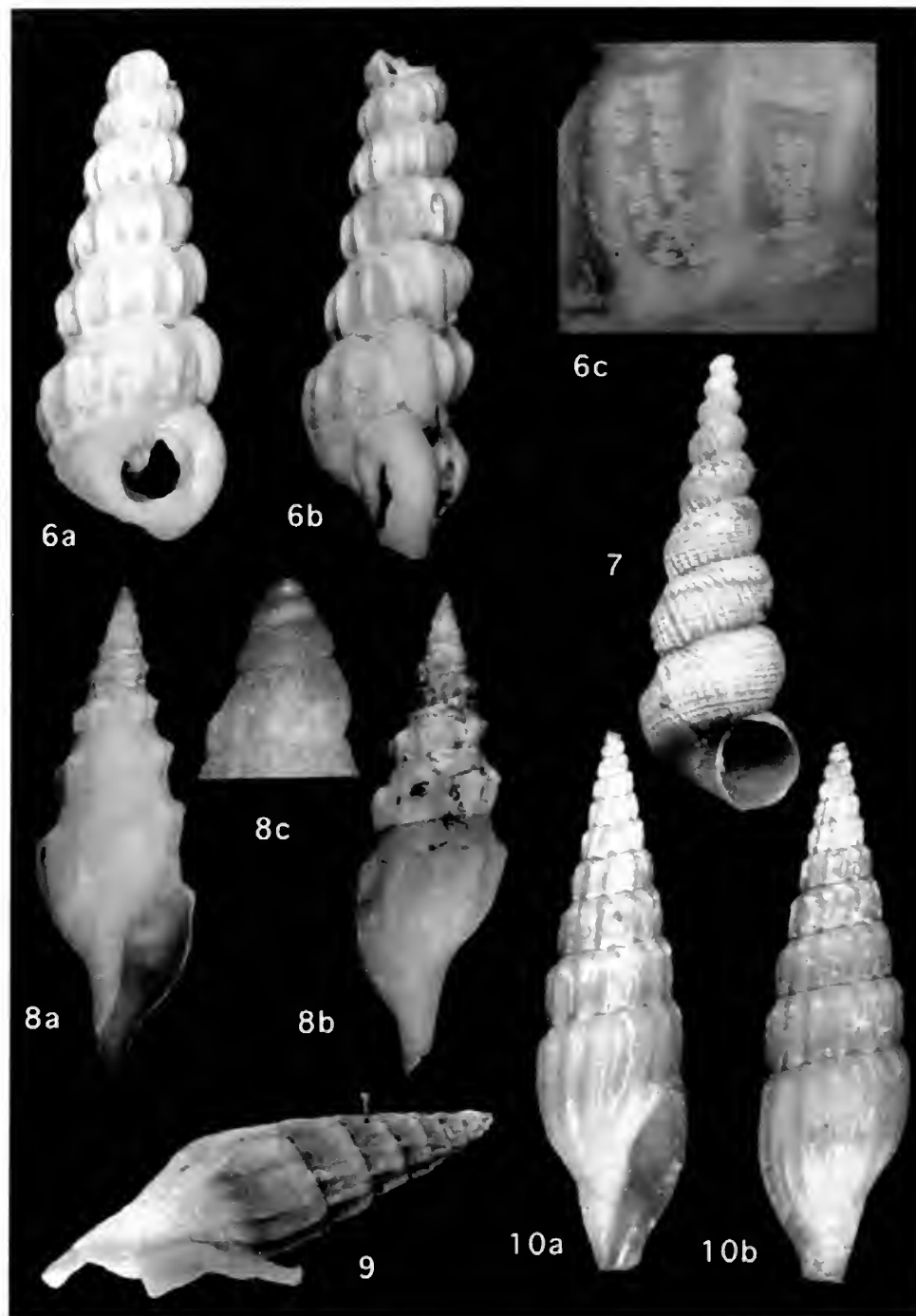


Plate II. Figures 6 - 10

6. *Gregorioiscula pachya* (Locard, 1897); NSF.III. 88: 27°35.22'N to 27°33.13'N, 91°52.31'W to 91°47.55'W, in 600-960 m, 16 mm, excluding broken apex. 7. *Eccliseogyra formosissima* (Jeffreys, 1884); "Bush Hill" site; hydrocarbon cold seeps, 27°46.904'N 91°30.286'W, in 546-555 m, 19 mm. 8. *Gymnobela* cf. *chyta* (Watson, 1881); NSF.III. 26: 28°44.43'N to 28°38.3'N, 87°30.53'W to 87°30.50'W, in 1773-1699 m, 18.4 mm. 9-10. *Volutomitra* cf. *bairdii* Dall, 1889 9. Live specimen with pink band. NSF.III.74: 28°06.52'N to 28°07.21'N, 89°36.99'W to 89°46.57'W, 850-610 m., 22.4 mm. 10. NSF.III. 88: 27°35.22'N to 27°33.13'N, 91°52.31'W to 91°47.55'W, in 600-960 m, 20.3 mm.

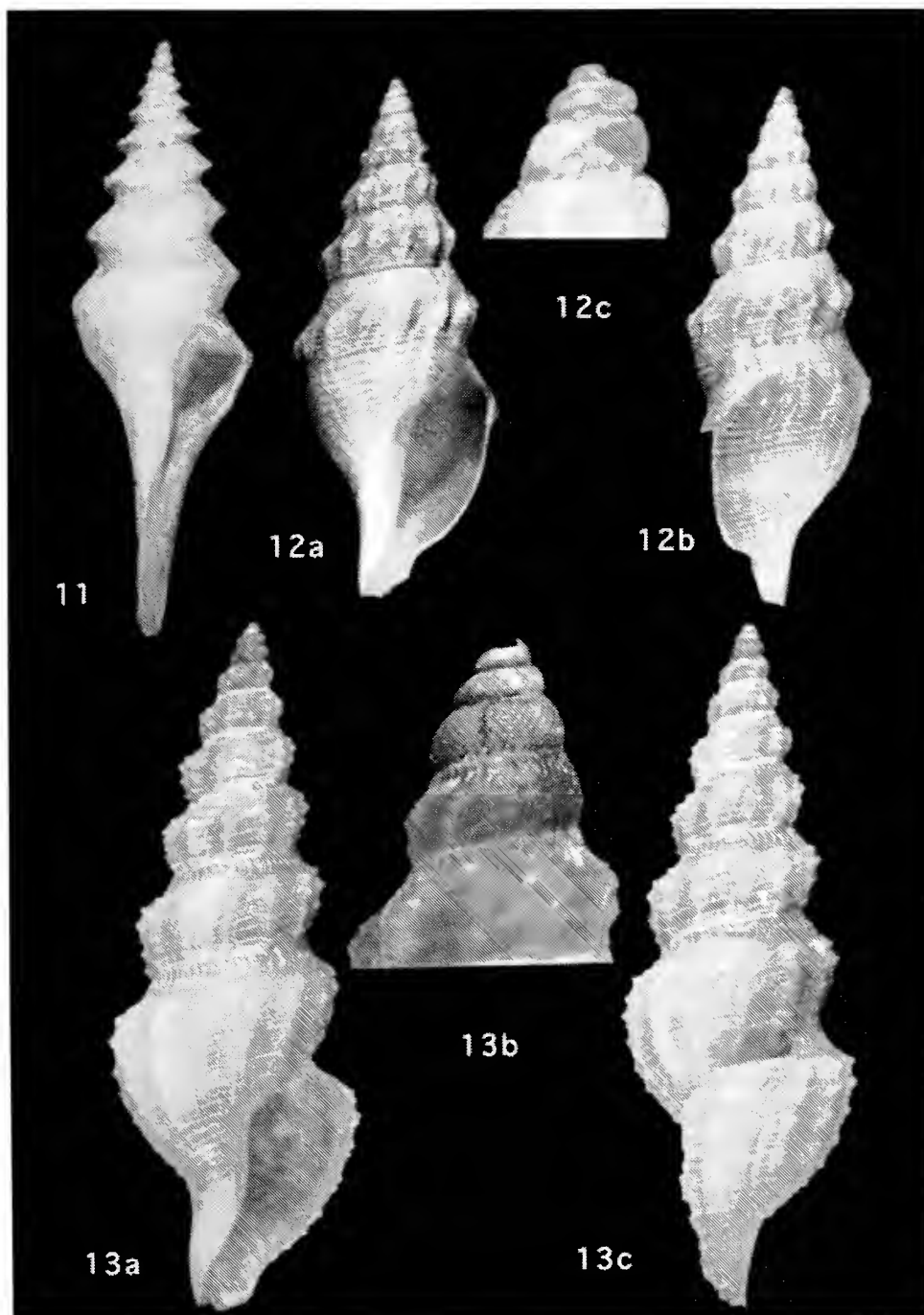


Plate III. Figures 11 - 13

11. *Leucosyrinx subgrundifera* (Dall, 1888); NSF.III. 88: 27°35.22'N to 27°33.13'N, 91°52.31'W to 91°47.55'W, in 600-960 m, 26.3 mm. 12. *Leucosyrinx* cf. *verillii* (Dall, 1881); NSF.III.74: 28°06.52'N to 28°07.21'N, 89°36.99'W to 89°46.57'W, 850-610 m, 16.6 mm. 13. *Pleuromella benedicti* Verrill & Smith, 1884; NSF.III.26: 28°44.43'N to 28°38.3'N, 87°30.53'W to 87°30.50'W, in 1773-1699.

fewer axial ribs. The single specimen of *Leucosyrinx* cf. *verillii* (Dall, 1881) (Figure 12) has stronger spiral sculpture than specimens of *L. verillii* collected during the expedition, and has a reddish band in the periphery; however, *L. verillii* is well-known for its great variability.

Acknowledgments

My thanks to Drs. Suzanne Fredericq and Darryl Felder, faculty members of the Biology Department at the University of Louisiana at Lafayette, for inviting me to join them in this expedition and to the unknown reviewer who improved the quality of this paper. Dr. Daniel Geiger and Mr. Richard Salisbury were consulted for identification of some of the species. The material for this study is based upon work supported by the National Science Foundation under Grant No. 0315995.

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THE ELEVENTH ANNUAL SCUM MEETING

JULES HERTZ¹

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The eleventh annual meeting of the Southern California Unified Malacologists (SCUM) was held on 20 January 2007 in the Parker Learning Center at the San Diego Natural History Museum (SDNHM). Refreshments were available at 8:00 a.m. and the meeting was officially convened at 9:00 a.m. There were 48 attendees (Figure 1), a record number for SCUM meetings. Tom Démeré, Curator of Paleontology at SDNHM, welcomed the group and set out the agenda for the day. He then turned over the meeting to Scott Rugh, Collection Manager in that department, the host for the meeting.

There was a round of self-introductions with each person giving some brief remarks on their interests and/or accomplishments in malacology during the past year. As examples, Lindsey Groves of the Natural History Museum of Los Angeles County (LACM) talked of working on the oldest known abalone fossil and about nearing completion of a database on 100,000 lots of specimens and Jim McLean gave a status report of his books on the gastropods from Alaska to southern California. It looks like he is making giant strides and there is a chance that at least one volume would be published within two years. He had two binders containing many beautiful plates to show the attendees.

At the conclusion of the self-introductions, the meeting proceeded to the first of nine brief PowerPoint presentations. The first presenter was Hans Bertsch who gave a brief report of a newly-described nudibranch named for him and his wife Rosa and showed the picture featured in the latest issue of *The Nautilus*. He also briefly discussed the new book to be available shortly, an updated version of the *Sea of Cortez Marine Invertebrates* by Alex Kerstich and Hans Bertsch. This is a field guide to living species and he showed some of the species. He concluded with an abbreviated version

of the paper that he gave at the Seattle AMS/WSM meeting on Steinbeck & Ricketts.

Kent Trego spoke next on the abyssal-hadal holothurians from the Chile Trench. He showed a preserved example of a very large holothurian, *Psychropotes longicauda*, from the Scripps Institution of Oceanography (SIO) benthic collection.

The following presentation was Relative Influence of Predation and Recruitment of the Invasive Asian Mussel by Brian Cheng and Kevin Hovel from San Diego State University (SDSU). Brian was the presenter and he discussed biodiversity loss, food-web disruption, economic costs, and accelerating invasion rate. He spoke primarily about the invasive mussel species, *Musculista senhousia*, in Mission Bay, San Diego. The adverse effects include reduction of native clam growth and inhibition of seagrass reproduction. The mussel abundance increases exponentially. *Pteropurpura festiva*, a local murex, feeds on these mussels and can actually reduce local populations up to 95%. Brian is studying the effects of temperature, salinity and flow rate on the survival rate of the mussels.

Michael Vendrasco was the next speaker and he spoke on Chitons and Other Mollusks Past and Present. He discussed: 1) shell microstructure in Cambrian mollusks, 2) aesthete canal morphology in the Mopaliidae and 3) chiton assemblages from the lower portion of the San Diego Formation. He talked of phosphatic internal and external coatings replicating shell microstructures and said that new data shows a nacreous linear layer on internal shells for several species.

Nerida Wilson spoke on the Phylogeography of the Antarctic Nudibranch *Doris kerguelensis*. The Drake Passage formed 41 million years ago and kept species in Antarctica isolated. The retreat of the ice shelf allows

¹Mailing address: 3883 Mt. Blackburn Ave., San Diego, CA 92111, USA.



Photo: Lindsey Groves

Figure 1. Front Row: Carol Stadum, Shawn Wiedrick, Pat LaFollette, Wendy Storms, Kelvin Barwick, Ángel Valdés, Rosa Campay-Bertsch
 Second Row: Matt Doi, Phil Liff-Grieff, Lance Gilbertson, Constance Gramlich, Hans Bertsch, Barbara Myers, LouElla Saul
 Third Row: Dan Yoshimoto, Kathy Kalohi, Christine Fernandez, Tom Démeré, Brian Cheng, Eliza Moore, Richard Squires, Chuck Powell
 Fourth Row: Maggie Hart, Yvonne Kugies, Greg Rouse, Mary Stecheson, Nancy Schneider, Bill Schneider
 Fifth Row: Bill Hewson, Nerida Wilson, Daniel Geiger, Jim McLean
 Top Row: Ian Browne, Mike Vendrasco, Lindsey Groves, Kent Trego, Paul DeFlorio, Gracie Jones, Jules Hertz, Carole Hertz, Scott Rugh, Rosangela Rugh, George Kennedy
 Attendees not in photo: Jean Domnitz, Pat DonVito, Wes Farmer, Diane Jovee, Chris Plouffe, Melissa Soetaert.

repopulation of animals to occur. The question discussed was do circumpolar species exist at -40°F . *Doris kerguelensis* is a generalist sponge feeder, direct developer, has low dispersal capabilities and has been found at depths of 4 to 1550 m. Tuberal size and shape and body color vary with time. There are approximately 12-15 synonyms for this species which has been reported around the Antarctic continent.

Phil Liff-Grieff describes himself as a hobbyist. He is an avid collector of land snails, minute shells and chitons. He talked briefly of land snail collecting in Hawaii and coastal California species in the family

Helminthoglyptidae. He is interested in collecting localities and boundaries between sympatric species.

Bill and Nancy Schneider followed with an update on their 2005 story of a black coral and its associated species that Bill collected while fishing off Hurricane Bank. They donated the coral to Scripps Institution of Oceanography (SIO) where it will be housed in a special case. They showed pictures of all the species found with the coral and stated that there may be an undescribed barnacle species attached to the coral.

Bill Hewson from California State University at Fullerton spoke on the Biogeography of *Lottia*

strigatella and *Lottia paradigitalis*. It has long been considered that *L. paradigitalis* is the northern species and *L. strigatella* the southern species, with Pt. Conception as the point of separation. Bill's molecular studies showed that there may be an overlap on both sides of the boundary and there may be a third species in the south which also makes it north of Pt. Conception.

Wes Farmer gave the final presentation with a group of photos on what one might see on a fun day at the beach. This concluded the presentation phase of the meeting.

The attendees had time during the meeting,

particularly during the lunch break, to tour some of the permanent exhibits at the San Diego Natural History Museum with Scott Rugh. At the end of the meeting attendees were invited to visit the Paleontology and Marine Invertebrate Departments and their collections.

The next annual SCUM meeting will be held in January 2008 at the LACM. Lindsey Groves will notify all interested parties of the date.

My thanks to Lindsey Groves for providing the photograph of the group and the accompanying figure legend.

IN MEMORIAM

David K. Mulliner

April 15, 1921 – January 24, 2007

It was a shock to learn that our long-time friend and colleague, Baja Dave, had died suddenly after a fall. All who knew him will be sadder for his passing. *The Festivus* will be publishing a remembrance of Dave in an upcoming issue.

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The Festivus.
American Museum of Natural
History
Received on: 03-02-07



THE FESTIVUS

A publication of the San Diego Shell Club

ISSN 0738-9388

Volume: XXXIX

March 8, 2007

Number: 3

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The Festivus is published monthly except December.
 The publication date appears on the masthead above.
 Single copies of this issue: \$5.00 plus postage.

Meeting date: third Thursday, 7:30 PM.
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PROGRAM

The Antarctic Revisited

Paul Dayton, Professor of Oceanography at Scripps Institution of Oceanography, will present an illustrated talk discussing the environmental changes in the Antarctic in the past 30 or so years.

Meeting date: March 15, 2007

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CLUB NEWS

**Minutes of the San Diego Shell Club Meeting
February 15, 2007**

President John LaGrange called the meeting to order at 7:45 p.m. The minutes of the January meeting were approved as published in *The Festivus*. It was with sadness that John announced the death of longtime member, Dave Mulliner.

Visitor, Michael, from Colorado was welcomed, as was new member, Clint Crowe.

President LaGrange introduced the evening's speaker, Bob Yin, noted underwater photographer. For the past fifty years Bob has been a diver, and a photographer for nearly that long. He currently spends four months a year traveling and diving. Much of his time is spent in the "Coral Triangle" of Indonesia, Malaysia, and the Philippine Islands. And that is where he took us, by camera, computer, and projector.

One of the few pristine areas left in the world lies north of Australia in Indonesia, on the islands of Raja Ampat. Using a \$200 digital camera, Bob showed us the small, tree-covered island of Wai, then zoomed in to reveal the single house present on the island. At night, he reported, fireflies lit up the forest like a Christmas tree. Underwater, his camera captured an opaque school of catfish that became detailed individuals in response to the zoom lens. *Tridacna*, *Spondylus*, *Cypraea* all were captured live by his lenses. A video clip from the camera revealed gently waving, spotted eagle rays, a juvenile whale shark in the background. Another clip revealed the emergence of a damsel fish from her home in a beer can. The audience was enthralled by these images.

Silvana Vollero won the door prize (winning number pulled by son, Christian!).

The meeting was adjourned at 8:30 p.m. Cookies

on the coffee table were baked by Wes Farmer and John LaGrange.

Nancy Schneider

Too Late for the Roster

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An E-mail Change for *The Festivus*

This is to announce a new e-mail address for *The Festivus* and for Carole and Jules Hertz who have now joined the 21st century by going cable. In future, please e-mail us at *The Festivus* with [<jhertz@san.rr.com>](mailto:jhertz@san.rr.com). We are assured that mail to our former address will be forwarded to the new address in the near future.

IN MEMORIAM**MARILYN NORTHRUP**

We are saddened to report the untimely death of member Marilyn Northrup in a diving accident.

OBSERVATIONS OF BROODING IN TWO SPECIES OF *SAXICAVELLA* FISCHER, 1978 (BIVALVIA, HIATELLIDAE, SAXICAVELLINAE) FROM SOUTHERN CALIFORNIA

KELVIN BARWICK AND TIMOTHY STEBBINS

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Introduction

Little is known about brooding in the Hiatellidae, although it is a common reproductive strategy in other bivalve mollusks occurring in more than 30 different families (Sellmer, 1967; Mackie, 1984). In fact, the only record for this family or any Hiatelloidea is that of Scott (1994) who described a new type of brood protection in the genus *Saxicavella*. Partly because of the unique and apparently restricted nature of this particular method of brooding, Scott erected a new subfamily, the Saxicavellinae, and also suggested that the group should possibly be elevated to family status. This note provides additional information and observations of this unique form of larval protection in the two species of *Saxicavella* that occur in southern California waters, *Saxicavella nybakkeni* Scott, 1994, and *Saxicavella pacifica* Dall, 1916.

Methods

The specimens examined in this study were collected as part of the Southern California Bight 2003 Regional Monitoring Project (Bight'03) conducted in the summer of 2003. Infauna samples were collected with a 0.1 m² Van Veen grab and sieved through a 1 mm mesh screen. Material retained on the screen was placed in a relaxant solution of about 1 kg MgSO₄ per 20 L of seawater for at least 30 minutes, and then fixed in 10% sodium borate buffered formalin for a minimum of 72 hours. Each sample was then rinsed with freshwater

and transferred to 70% ethyl alcohol for final preservation. All organisms in the samples were sorted into major taxonomic categories (e.g., mollusks, annelids, arthropods, echinoderms), and sent to experienced taxonomists for species identification. Bivalve mantle morphology and terminology used herein are modified after Yonge (1971).

Results and Discussion

Saxicavella specimens with brood attached were collected from two different sites located in the northern part of Southern California Bight (SCB) during the Bight'03 regional survey (Table 1). Adults of both species were present at each site. Although a total of 12 adults occurred in these samples, only 3 animals were observed with brood attached to the middle and outer mantle folds. Brooding adults included 1 specimen of *Saxicavella nybakkeni* and 2 specimens of *Saxicavella pacifica*.

In a sample containing 3 adult *S. nybakkeni* and 1 adult *S. pacifica*, only 1 specimen of *S. nybakkeni* had brood animals attached to the mantle folds (Figures 1-2). A total of 4 offspring were evident with an average length of 0.28 mm. Three of the offspring were attached on or very near the middle mantle fold of the parent along the posterior margin of the pedal aperture, while the fourth offspring was affixed to the outer mantle fold. The method of brood attachment, while probably a byssus (Scott, 1994), was not evident. This sample was collected at a Bight'03 station located offshore of

Table 1. Brooding *Saxicavella* from the Bight'03 Regional Monitoring Survey

Station	Depth (m)	Date	Species	Number of Adults		Brood Observations
				Total	Brooding	
4079	36.5	23 July 2003	<i>S. nybakkeni</i>	3	1	4 attached offspring (Figures 1, 2)
			<i>S. pacifica</i>	1	0	No brood
4123	56.5	30 July 2003	<i>S. nybakkeni</i>	1	0	No brood
			<i>S. pacifica</i>	7	2	1 adult with 1 attached offspring; 1 adult with 2 attached offspring (Figures 3-5)

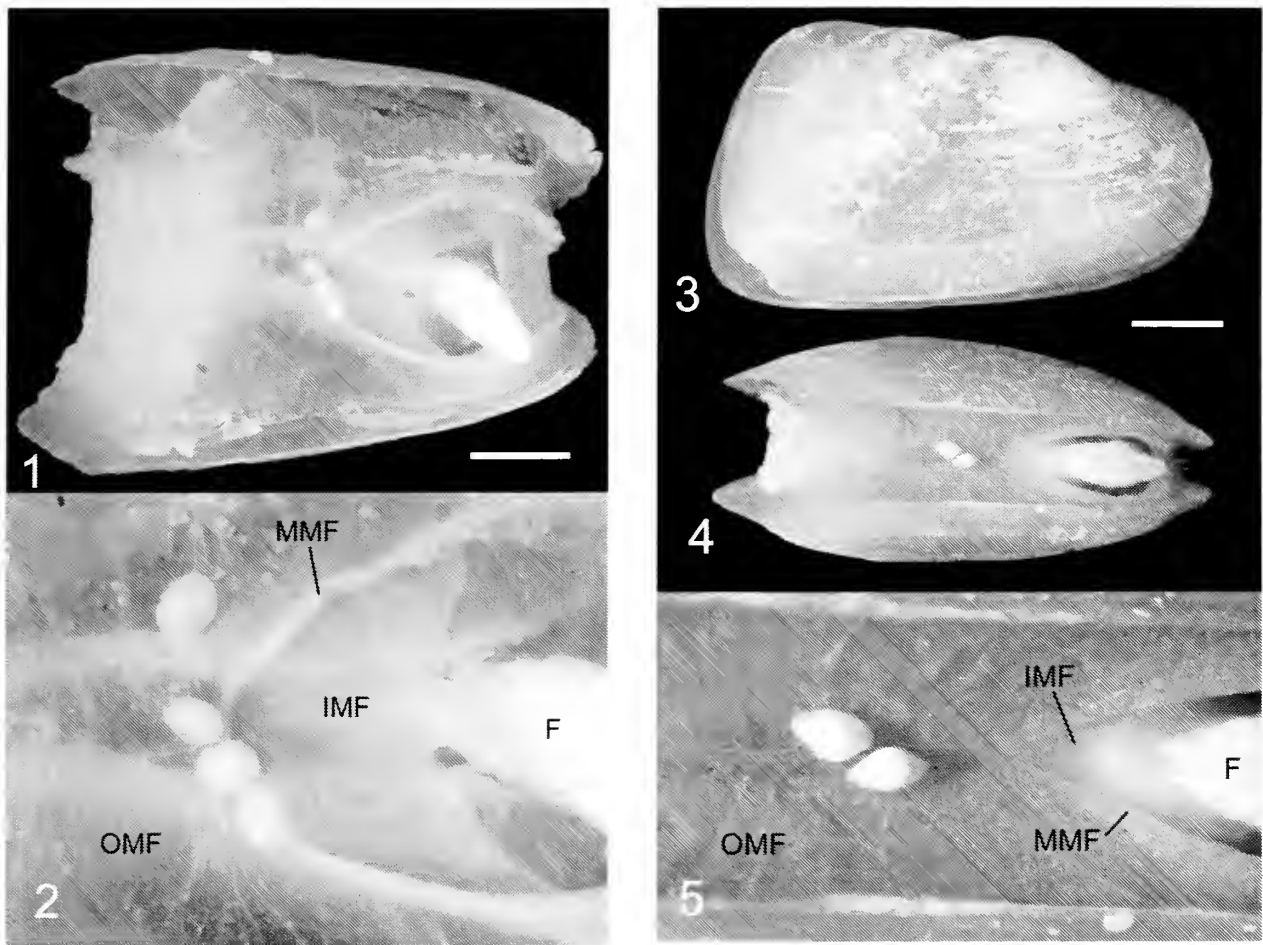
Carpinteria, California in olive-green sediments composed of silt and clay.

In a second sample from the same survey, 2 out of 7 individuals of *S. pacifica* present were discovered with brood attached (Figures 3-5). A single specimen of *S. nybakkeni* was also found in this sample but with no external brood evident. One of the adult *S. pacifica* had a single offspring and the other had 2 offspring, with the individual brood animals attached at their ventral shell margin. The offspring were affixed to the parents along the midline of the ventrum on the outer mantle fold, posterior of the pedal aperture. The 3 offspring averaged 0.31 mm in length. As with brooding *S. nybakkeni*, the method of brood attachment was not evident here for *S. pacifica*, although it was also likely by a byssus. These specimens were collected at a Bight'03 site located off the coast of Gaviota, California in olive-green sediments composed of sand, silt, and clay. Scott (1994) reported finding broods of *S. nybakkeni* in a pouch formed between the inner and outer mantle folds. He hypothesized that as the brood animals develop, they migrate to the outer mantle before being released. This fits well with the present observations where offspring for both *S. nybakkeni* and *S. pacifica* were found attached to the middle and outer mantle folds of the parents. These records provide

additional evidence of this unique form of larval protection in *Saxicavella* and further support Scott's proposition that the subfamily Saxicavellinae should be elevated to family level.

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**Figures 1 – 2**

Saxicavella nybakkeni Scott, 1994. (1) ventral view of adult with 4 offspring, scale bar = 1 mm; (2) detailed ventral view of above: F = foot, IMF = inner mantle fold, MMF = middle mantle fold, OMF = outer mantle fold. (Bight'03 Station 4079, 25 July 2003, 36.5m, K. Barwick personal collection catalog #0277).

Figures 3 – 5

Saxicavella pacifica Dall, 1916. (3) right valve, lateral view; (4) ventral view of adult with 2 offspring, scale bar = 1 mm; (5) detailed ventral view of above: F = foot, IMF = inner mantle fold, MMF = middle mantle fold, OMF = outer mantle fold. (Bight'03 Station 4123, 30 July 2003, 56.5m, K. Barwick personal collection catalog #0278).

BOOK NEWS

The Mollusks: a guide to their study, collection, and preservation

2006. C.F. Sturm, T.A. Pearce and A. Valdés, editors

Published by the American Malacological Society (Pittsburgh, PA), 445 pp.

\$35.95 USD

How times have changed! This book is a continuation of the American Malacological Society's *How to Collect Shells*, editions 1-4, published from 1942 to 1974. Note that the 4th edition was titled *How to Study and Collect Shells* (emphasis mine); already it was reflecting a need to learn more about the animals inside the shells. This current edition also reflects the times by concentrating even more on the study of mollusks and includes a sizeable contribution on their curation: maintaining collections of shells and wet specimens, and even the use of databases to keep track of collections both in museums and private collections.

The editors have done a wonderful job of putting together 31 chapters by assorted molluscan experts on topics as diverse as molluscan anatomy, an introduction to phylogeny (wow, was that ever valuable to an old codger like me!), chapters and sections on collecting, sections on each mollusk type and their ecology and evolution, preservation and curation (don't put your shells in an oak cabinet!), conservation and extinction (more mollusks have gone extinct than birds and mammals combined), and even useful websites and organizations to join to meet other malacologists and contribute to molluscan conferences.

I wish I could review each chapter separately, all by my colleagues and friends, but space is limiting so I'll pick out a few highlights. Chapter Three by Burch and Sturm, is largely a rewrite of Tom Burch's 1941 article on remote bottom collecting. As he points out, it was obviously written before SCUBA was invented (and Chapter Four covers collecting by SCUBA) but the tools and techniques are still used and useful today. As he points out: "every shell collector who has gotten up at an unearthly hour in the morning to collect at a minus tide has gazed out beyond the narrow band of shore left uncovered by the retreating waters and wondered what rare treasures he could find, if the sea would but drop a hundred feet or so for awhile." He then goes on to discuss simple dredges, grabs, traps and tangle nets for personal use to catch mollusks. Not everyone can SCUBA dive and as one who has had to give it up myself, I still collect vicariously using such methods.

As a cephalopod specialist I especially appreciated

Andy Anderson's chapter on cephalopods. Have you ever wondered how the Smithsonian Institution went about preserving a giant squid? In light of the first videos and first capture of a live giant squid such curiosity might lead you to this chapter where you learn how to do it. Andy goes on to discuss the different orders of cephalopods, their taxonomy, behavior, evolution and curation in detail.

I have a small quibble with this section. Cephalopods, especially octopuses, are intelligent animals. Octopuses can learn classic target training for food, navigate mazes, and open screw-top and even child-proof pill bottles to get at food. They have individual personalities, they exhibit play behavior, and they can recognize individual humans. As such we have to think of the ethics of capturing them, maintaining them in laboratories, and narcotization and euthanasia as we would for chimpanzees maintained in the lab. I would have liked to see more mention of the ethics of dealing with these clever animals in an otherwise excellent review of the class. Maybe it will be emphasized more in the next edition.

I've always had a fascination with the Aplousobranchia, a class of mollusks first discovered in 1844, unlike most other mollusks that were written about by Aristotle. Without shells, these are far different from cephalopods and the other classes of mollusks. They are all worm-like maybe showing an evolutionary connection to annelid worms, and they burrow in deep soft sediments. They have a radula and a mantle cavity like any other good mollusk and they are covered thoroughly by the eminent contributor Amélie Scheltema.

Overall, this is a wonderful book that every malacologist and most shell collectors should own. It is the most up-to-date text on mollusks in general, and it contains a wealth of information for all people interested in the phylum. Note that if you order it direct from the publisher (Universal Publishers, Boca Raton, FL) a greater percentage of the profit goes to the AMS. You can also order it from the American Malacological Society website.

Roland Anderson

A TRAWL-CAUGHT PEN SHELL, *ATRINA OLDROYDI* DALL, 1901, COLLECTED BY THE ORANGE COUNTY SANITATION DISTRICT

CHRISTINA THOMAS

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The Orange County Sanitation District (OCSD) is a large publicly owned treatment works plant that discharges highly treated wastewater to the ocean through an off-shore, submarine outfall located off Newport Beach and Huntington Beach, California. The OCSD's discharge is jointly regulated by the United States Environmental Protection Agency and the California Regional Water Quality Control Board, who issue the National Pollutant Discharge Elimination System Permit under the Federal Clean Water Act. This permit requires OCSD to implement an ocean monitoring program (OMP) that evaluates potential environmental and public health effects from the wastewater discharge. A major component of the OMP is assessing the health of demersal fish and epibenthic macroinvertebrates (EMI) through otter trawl sampling. The OCSD trawls at nine core-monitoring stations and one historic station bi-annually (summer and winter).

During routine, summer sampling on August 21, 2006, OCSD collected a live, intact *Atrina oldroydi* Dall, 1901, at the trawl station T1 (33° 34.620 N; 118° 0.449' W) (Figure 1). This station is located at the end of the outfall pipe at a depth of 60 m. Like all the 60 m stations in OCSD's monitoring area, T1 has soft, sandy sediments, but the area near the outfall tends to have a larger grain size and a lower percentage of fines than the other 60 m sites probably due to scouring of currents and shell hash (i.e. bivalve shells attached to the outfall structure) (OCSD 2005).

Atrina oldroydi is rarely collected in trawl nets. In fact, this is the first trawl record of an *Atrina* species in OCSD's monitoring area in over 30 years of sampling. Two animals, however, were collected in 1998 at station ZB2 with a VanVeen grab sampler. Station ZB2 is also located near the outfall pipe and is at the boundary of the zone of initial dilution (ZID).

Because pen shells are so brittle and fragile, they are rarely collected intact. These animals are protected



Figure 1. *Atrina oldroydi* collected off Huntington Beach, California at 60 m, length 201 mm.

by the mud into which they bury with only a portion of the posterior margin of the shell exposed above the surface. The shell is anchored into the protective sediment by the byssus. Trawl nets are designed to collect animals that live on the sediment surface, thus a buried pen shell is very rarely collected in trawls. This intact pen shell was likely jostled by something, such as ray feeding, which removed some of the protective sediments or it was no longer held in place by its byssus (Don Cadien, personal communication).

The *Atrina oldroydi* specimen collected by OCSD has a large, dark brown and olive colored shell, measuring 201 mm in length and 119 mm in height. It fits the description from Coan et al. (2000) of "relatively thick, with low commarginal lamellae and obscure, low radial ribs; periostracum thick." The animal does, however, have some raised, serrated radial ribs, which is consistent with *A. texta*. Upon further

investigation and comparison of vouchered *Atrina* species at the Santa Barbara Museum of Natural History (SBMNH), SCAMIT (Southern California Association of Invertebrate Taxonomists) taxonomists concurred that the animal was *A. oldroydi*, despite the low serrations and being collected out of its depth range, which is reported at 2-46 m from San Pedro, California to Punta Pequeña, Baja California Sur (Coan et al., 2000).

The OCSD has preserved this animal in 100% ethanol and added it to its voucher collection. Prior to preservation, the animal was kept frozen until a sample of adductor muscle tissue was extracted by Paul

Valentich-Scott at the SBMNH (vouchered as SBMNH 83140). DNA analysis of this muscle tissue may lead to a better understanding of the *Atrina* species.

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2000. Bivalve Seashells of Western North America: Marine Bivalve Mollusks from Arctic Alaska to Baja California. Santa Barbara Museum of Natural History Monographs No. 2, Studies in Biodiversity No. 2.

ORANGE COUNTY SANITATION DISTRICT (OCSD)

2005. Ocean Monitoring Annual Report, July 2004 – January 2005. Marine Monitoring, Fountain Valley, California.

TO ALL OUR SHELLING FRIENDS

YOU ARE CORDIALLY INVITED TO ATTEND

SAN DIEGO SHELL CLUB'S ANNUAL AUCTION/POTLUCK

Have we got shells for you!!!

The San Diego Shell Club's annual auction/potluck will be held on Saturday evening April 28th in the community room of Wes Farmer's condo at 3591 Ruffin Rd., San Diego, CA 92123. Festivities will begin at 5 p.m. with "Dave's Punch", wine, and soft drinks while you view the auction table. Dinner will be at 6 p.m. sharp and the voice auction will begin promptly at 7 p.m.

Among some of the very special items for auction are a number of books, pieces of coral and a Julianne Johnson 30 x 23 in. lithograph entitled *Red Iris with Shell*. Among the many beautiful shells for auction are: *Trophon. beebei*, *sorenseni*, *bentleyi* and *avalonensis*, *Haliotis dalli*, *Strombus taurus* and *S. heli*, *Oliva foxi*, many great cowries like *C. aurantium*, *marginata*, *aequinoctialis*, *ostergaardi*, *jeaniana*, *rashleighana*, *sanctahelenae* and *nigropunctata* and outstanding volutes, cones, murex and marginellas.

Most of the shells are from the Twila Bratcher-Critchlow and Billee Gerrodette collections. Besides the voice auction, there will be a huge silent auction and a larger than ever \$1 table.

This is the Club's only fundraiser and the biggest social event of the year. Your help is needed to make it a success. The annual auction provides the Club with the funds necessary to support its many activities such as *The Festivus*, Club library purchases, donations toward student grants, Greater San Diego Science Fair participation as well as the Club's social functions.

If you plan to attend, please contact Carole or Jules Hertz at (858) 277-6259. There will be a map to the auction with the April issue. You can bring either a main dish, salad, or dessert to serve 12. If you have donations for the auction, please call us ahead so that we can get them included on the auction list.



THE FESTIVUS

A publication of the San Diego Shell Club

ISSN 0738-9388

Volume: XXXIX

April 12, 2007

Number: 4

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Annual dues are payable to San Diego Shell Club.
Membership (includes family). Domestic \$20.00;
Overseas (air mail):\$30.00; Mexico/Canada (air mail):\$20.00.

Address all correspondence to the San Diego Shell Club, Inc.,
c/o 3883 Mt. Blackburn Ave., San Diego. CA 92111, USA.

The Festivus is published monthly except December.
The publication date appears on the masthead above.
Single copies of this issue: \$5.00 plus postage.

Meeting date: third Thursday, 7:30 PM.
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COME TO THE AUCTION/POTLUCK!

Saturday evening, April 28th

See map with this issue.

(There will be no regular meeting this month.)

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CLUB NEWS

**Minutes of the San Diego Shell Club Meeting
March 15, 2007**

President John LaGrange called the meeting to order at 7:45 p.m. Several visitors were introduced and welcomed. The minutes of the February meeting were accepted as printed in *The Festivus*.

Announcement was made of next month's Annual Shell Auction/Potluck to be held in lieu of a regular meeting. Gathering will commence at 5 p.m. at Wes Farmer's, Community Room with potluck dinner to begin at 6 p.m. This will be followed by both silent and voice auctions. Many auction items will be from the collections of Twila Bratcher-Critchlow and Billee Gerrodette.

Vice-President Carole Hertz introduced the speaker of the evening, Paul Dayton, Professor at Scripps Institution of Oceanography. From 1963 to 1989, he made observations of the marine invertebrate fauna at McMurdo Sound in Antarctica. His work followed that of Hodgson in 1904 and Shackleton's visit in 1908. Much of the interesting, preceding history of this desolate area was recounted to the audience.

Dayton's scientific diving served to establish ecosystems related to water and ice depth in McMurdo Sound. Sponges observed ranged to two meters in height, soft corals to 12 feet high. A solitary starfish did not move its body for three years. One ecosystem was dominated by bryozoans, another by sponges. Molluscan sightings were infrequent. His photographic presentation was well received and elicited many questions.

Hans Bertsch announced that he has revised Kerstitch's *Sea of Cortez Marine Invertebrates*, and it is

soon to be released. The new edition Kerstitch & Bertsch (2007) now includes 303 species in full color.

Jules Hertz won the evening's door prize. The meeting was adjourned at 8:55 p.m. Refreshments for the coffee table were provided by Marilyn Goldammer and Carole Hertz.

Nancy Schneider

Additions to the Roster

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An E-mail Change for *The Festivus*

This is to announce a new e-mail address for *The Festivus* and for Carole and Jules Hertz who have now joined the 21st century by going cable. In future, please e-mail us at *The Festivus* with <jhertz@san.rr.com>. We are assured that mail to our former address will be forwarded to the new address in the near future.

IN MEMORIAM

JOHN PHILLIPS

September 4, 1938 - March 18, 2007

It is with sadness that we report the passing of John Phillips from esophageal cancer. He was a shell enthusiast from an early age and never lost his passion for shells.

RANGE EXTENSION FOR THE PANAMIC MUSSEL *CHOROMYTILUS PALLIOPUNCTATUS* (CARPENTER, 1857)

JOHN LAGRANGE

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On a recent trip to the west coast of central Baja California I found a mussel that I did not recognize (Figures 1, 2). I was camping on a beach east of the fishing village of Asunción in northern Baja California Sur, México (27°08'37"N, 114°12'26"W). The sand beach there is interrupted by an ancient lava flow that extends into the surf zone. The mollusks of this area are interesting in that they are mostly Californian, but there are several Panamic species present. The area was described in a 1984 article in *The Festivus* by Hertz & Hertz who listed 195 mollusk species collected there in 1981.

In August of 2006 I found the intertidal rocks to be largely covered with a dense population of small mussels. Most of these individuals were less than 10 mm in length, but there were a few clumps of specimens up to about 65 mm in length. They occurred on rocks exposed to vigorous surf action, where one would expect to find *Mytilus californianus* Conrad, 1837. There were, in fact, some clumps of *M. californianus*, but they were far outnumbered by the smaller species. The smaller mussels extended into the subtidal area as well. The rocks there mostly disappear into sand at a depth of about 4 meters, and they were densely covered with the small mussels, right down to the sand (Figure 3).

I had visited the same area in August of 2005 and did not notice these smaller mussels. I think the specimens that were > 60 mm in 2006 must have been present in 2005, but there were relatively few. The small individuals that now cover the rocks must have settled sometime after August 2005, and now dominate the lower intertidal and subtidal rocks near Asunción.

The appearance of these mussel beds is distinctly different from either of the usual California mytilids,

M. californianus or *M. galloprovincialis* Lamarck, 1819. I have rarely seen beds of either of these species of such density and uniform-sized individuals. The overall color of the exterior of the shells gives the bed a reddish-brown appearance rather than the black or blue-black of our California species. When examined closely the shells are quite smooth on the outside, similar to *M. galloprovincialis*, but the color and overall narrower shell shape are quite distinctive.

After examining specimens of the shells, Paul Valentich-Scott of the Santa Barbara Museum of Natural History eventually identified them as *Choromytilus palliopunctatus* (Carpenter, 1857). The pinprick-like scars reported as characteristic of this species in Keen's (1971) *Sea Shells of Tropical West America* were hard for me to detect, especially on the small specimens. However, the contrasting white color on the internal ventral margin of the shell was easily visible.

The range of *Choromytilus palliopunctatus* is listed by Keen as being from Panamá to Bahía Magdalena, so the population at Asunción represents a range extension of about 200 miles to the northwest. I did not visit the rocky coast that extends north of Punta Asunción in 2006, so it is quite likely that *C. palliopunctatus* actually has spread even further to the north. This range extension seems out of the ordinary in that a species has suddenly become dominant in an area outside its previous range. The population has the appearance of an invasive alien species rather than a fringe population outside the normal range.

Thanks to Paul Valentich-Scott for identifying the specimens. Specimens have been deposited in the Santa Barbara Museum of Natural History and vouchered as SBMNH 83117.

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Figure 1. Interior of shell of *Choromytilus palliopunctatus* collected at Punta Asunción.



Figure 2. Exterior of shell of *Choromytilus palliopunctatus*.



Figure 3. Intertidal rock at Punta Asunción covered with small *Choromytilus palliopunctatus*.

A THREE-HOUR SURVEY OF THE MARINE MOLLUSKS OF THE ISLAND OF LITTLE SAN SALVADOR, BAHAMAS

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Introduction

Little San Salvador is a 7.25 square km cay (a cay is a small low island consisting mainly of sand or coral) in the central Bahamas, at 24°34'N and 75°55' W. The island is 153 km southeast from Nassau, almost exactly halfway between the southern tip of Eleuthera and the northern end of Cat Island (Figure 1). In outline Little San Salvador is a narrow bifurcated bar, about 10 km long.

In 1997, Little San Salvador was purchased by a cruise line and re-named "Half Moon Cay", partly because of a large half-moon-shaped beach on the southwest side. Only 18 ha (hectares) out of a total of 971 have been developed for visitors; currently the rest of the island is being left as a wildlife preserve.

On 6 March 2002, the junior author visited the island for a day, and was able to use part of that time to look for beach shells. Although the time spent on the search was only three hours, shells of 70 marine mollusks were found.

There are currently no restrictions on collecting dead shells in the Bahamas, except in the Land and Sea National Parks, which are under the care of the Bahamas National Trust.

Results

Along the sheltered half-moon beach, paired valves of



Figure 1: Map of the Bahamas and surrounding areas.

one species, *Tellina radiata* Linnaeus, 1758, were found. The shells of the other 69 species were found on a sand beach with coral rock boulders, just around the southeastern tip of the cay on the windward side. The whole beach was searched, but in particular, beach drift

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had accumulated very densely in one 2m x 2m "pocket" under an overhanging coral rock in the intertidal zone: lying prone and partially immersed, the junior author

carefully hand-picked shells of as many different species as possible from that one patch of drift. The total list of species found is shown in Table 1 below.

MOLLUSK SPECIES FROM BEACHDRIFT, LITTLE SAN SALVADOR, BAHAMAS, 3/6/02

* Shells in which the aperture (or orifice, or other part of shell) was filled with cemented debris.

** *Chama sarda* is used in the limited sense, as defined in Campbell et al., 2004.

*** See Mikkelsen & Bieler, 2003.

Class GASTROPODA

**Fissurella angusta* (Gmelin, 1791)
Fissurella barbadensis (Gmelin, 1791)
Lotia sp.
Tegula fasciata (Born, 1778)
Nerita tessellata Gmelin, 1791
Nerita versicolor Gmelin, 1791
Nodolittorina angustior (Mörch, 1876)
Nodolittorina dilatata (d'Orbigny, 1842)
Nodolittorina mespillum (Mühlfeld, 1824)
Rissoina sp.
Cerithium eburneum Bruguière, 1792
Cerithium litteratum (Born, 1778)
Cerithium sp.
Petalconchus sp.
Serpulorbis decussatus (Gmelin, 1791)
Serpulorbis ?riisei (Mörch, 1862)
Strombus gigas Linnaeus 1758
Hipponix antiquatus (Linnaeus, 1767)
Eiosaria acicularis (Gmelin, 1791)
**Cyphoma gibbosum* (Linnaeus, 1758)
Niveria pediculus (Linnaeus, 1758)
Natica livida Pfeiffer, 1840
**Naticarius canrena* (Linnaeus, 1758)
Polinices lacteus (Guilding, 1834)
Tonna pennata (Mörch, 1852)
Cymatium martinianum (d'Orbigny, 1846)
Cymatium nicobaricum (Röding, 1798)
Thais deltoidea (Lamarck, 1822)
**Trachypollia nodulosa* (C.B. Adams, 1845)
**Engina turbinella* (Kiener, 1835)
Pollia tinctoria Conrad 1846
Columbella mercatoria (Linnaeus, 1758)
Nitidella nitida (Lamarck, 1822)
Morum oniscus (Linnaeus, 1767)
Oliva reticularis Lamarck, 1810
Olivella nivea (Gmelin, 1791)

Prunum guttatum (Dilwyn, 1817)
Mitra barbardensis (Gmelin, 1791)
**Mitra nodulosa* (Gmelin, 1791)
Vexillum sykesi (Melvill, 1925)
**Conus pealii* Green, 1839
Conus regius Gmelin 1791
Pilsbryspira albomaculata (d'Orbigny, 1842)
Splendrillia fucata (Reeve, 1845)
**Crassispira ?drangai* (Schwengel, 1951)
**Bulla striata* Bruguière, 1792
**Melampus monile* (Bruguière, 1789)

Class BIVALVIA

Arca imbricata Bruguière, 1789
Barbatia cancellaria (Lamarck, 1819)
Tucetona pectinata (Gmelin, 1791)
Glycymeris decussata (Linnaeus, 1758)
Modiolus americanus (Leach, 1815)
Lima caribaea d'Orbigny, 1842
****Ctenoides mitis* (Lamarck, 1818)
Caribachlamys ornata (Lamarck, 1819)
Spondylus ictericus (Reeve, 1856)
Codakia costata (d'Orbigny, 1853)
Divaricella dentata (Wood, 1815)
Divalinga quadrisulcata (d'Orbigny, 1842)
Lucina pensylvanica (Linnaeus, 1758)
***Chama sarda* Reeve, 1847
Chama florida Lamarck, 1819
Chama congregata Conrad, 1833
Americardia media (Linnaeus, 1758)
Laevicardium laevigatum (Linnaeus, 1758)
Tivela abaconis Dall, 1902
Tellinella listeri Röding, 1798
Tellina radiata (Linnaeus, 1758)
Strigilla pisiformis (Linnaeus, 1758)
Donax denticulatus Linnaeus, 1758
Timoclea pygmaea (Lamarck, 1818)

Discussion

The most comprehensive account of the marine mollusk fauna of a Bahamian island, or island group, is Redfern (2001) for Abaco (1,000 species, based on 30 years of work). Not surprisingly, when we compare the Little San Salvador list to Redfern's comprehensive work, we see that all of the species on the list were also found on Abaco.

Judging by the data currently available (Rosenberg, 2006), other Bahamian islands have not been well investigated: Rosenberg's Malacolog database currently gives lists for 21 other islands in the Bahamas, and the lists of total species reported range from a low of 1 to a high of 145.

Prior to the current research, it appears that only 10 species had been reported from Little San Salvador: *Fissurella angusta* (Gmelin, 1791), *Calliostoma orion* Dall, 1889, *Cyclostrema cancellatum* Marryat, 1818, *Puperita pupa* (Linnaeus, 1767), *Eustrombus gigas* (Linnaeus, 1758), *Cassis tuberosa* (Linnaeus, 1758), *Cypraeassis testiculus* (Linnaeus, 1758), *Charonia variegata* (Lamarck, 1816), *Cymatium muricinum* (Röding, 1798), and *Cymatium nicobaricum* (Röding, 1798). Of these 10 species, only *Fissurella angusta*, *Eustrombus gigas* and *Cymatium nicobaricum* were also found in the current study; thus the new list of 46 gastropods and 24 bivalves succeeds in increasing substantially the knowledge of the marine mollusk fauna of this small island.

Although a few shells were very worn, many appeared fairly fresh, but, as indicated in Table 1, some gastropod shells had apertures partially or entirely cemented with coral debris, which probably indicates some age. Not surprisingly, most of the species are fairly common ones.

One shell of *Vexillum sykesi*, (Melvill, 1925), Syke's Miter, was found and this is shown in Figure 2. The shell is dark reddish brown with a creamy-white peripheral band which is most developed on the axial ribs. This species appears in general to be uncommon, or perhaps only locally common. It has been reported from eastern Florida, Texas, the Bahamas, Costa Rica and Curaçao. It may sometimes have been overlooked, because it is possible to mistake the shell for that of either *Vexillum exiguum* (C.B. Adams, 1845) or *Vexillum gemmatum* (G.B. Sowerby II, 1874), both of which it can superficially resemble. In any case, the species has not often been illustrated in the popular literature. In Abbott (1974) the species is shown as



Figure 2. *Vexillum sykesi*, 8.1 mm, beach drift from southeast tip of Little San Salvador.

number 2630, p. 240, under the synonym *V. moisei* McGinty, 1955. There is a description but no photograph in DeJong and Coomans, 1988. Fortunately there are four excellent images and a very complete description in Redfern, 2001, pl. 53 and p. 118.

Conclusions

The current study demonstrates that a fair representation of the fauna of an island can sometimes be ascertained in a very short period of time by meticulous hand picking of a rich patch of beach drift. When this is the case, useful scientific information can be obtained relatively easily and quickly by dedicated amateurs. Bringing Little San Salvador's faunal list from 10 species up to a combined total of 77 is a worthwhile achievement.

Acknowledgments

We would like to thank Colin Redfern, Harry G. Lee and Romauld Czepulkowski for help with the identification of several species, and Ron Hartley for the map.

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TO ALL OUR SHELLING FRIENDS

MARK YOUR CALENDARS

SATURDAY EVENING APRIL 28th

SAN DIEGO SHELL CLUB'S ANNUAL AUCTION/POTLUCK

The San Diego Shell Club's annual auction/potluck will be held on Saturday evening April 28th in the community room of Wes Farmer's condo at 3591 Ruffin Rd., San Diego, CA 92123. The festivities will begin at 5 p.m. with "Dave's Punch", wine, and soft drinks while you view the auction table. Dinner will be at 6 p.m. sharp and the voice auction will begin promptly at 7 p.m.

In addition to all the great auction items listed in last month's issue of *The Festivus* there are many volutes such as: *Amoria mollerii*, *A. dampiera*, *Voluta kieneri*, *V. ellioti*, *V. rupestris*, *V. punctata*, *V. kurodai*, *V. gilchristi*, *V. deliciosa*, *V. virescens*, *Melo broderipi*, *M. melo*, *Cymbiolacca persticta*, *Alcithoe calva* and *Adelomelon ancilla*. There are a large variety of *Latiaxis* like *marumei*, *echinata*, *cristata*, *deburghiae* and *lischkeanus*. There are also a variety of beautiful *Marginella* species such as: *helmantina*, *faba*, *limbata*, *elegans*, *sebastiani*, *goodalli*, *fulminata* and *macgintyi*. Most of the shells are from the Twila Bratcher-

Critchlow and Billee Gerrodette collections. Besides the voice auction, there will be a huge silent auction and a larger than ever \$1 table. If you are interested in seeing the auction list prior to the auction contact Carole & Jules Hertz at (858) 277-6259 or by e-mail at <jhertz@san.rr.com>. If you would like to bid on items but cannot attend, we can arrange for someone to bid for you.

This is the Club's only fundraiser and the biggest social event of the year. Your help is needed to make it a success. The annual auction provides the Club with the funds necessary to support its many activities such as *The Festivus*, Club library purchases, donations toward student grants, Greater San Diego Science Fair participation as well as the Club's social functions.

If you plan to attend, please contact Carole or Jules Hertz. You may bring either a main course, salad, or dessert to serve 12. If you have donations for the auction, please call us ahead so that we can get them included on the auction list.

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Single copies of this issue: \$5.00 plus postage.		Paul Valentich Scott	
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		<i>Natural History Museum of Los Angeles County</i>	
		Emily H. Vokes	
		<i>Emerita, Tulane University, New Orleans</i>	

A VISIT TO EASTER ISLAND

Harry Bedell, Club member, diver and photographer, recently visited Easter Island with members Marty Beals and Paul Kanner.

Harry will share some of their experiences with the Club in his illustrated talk and will also have a shell display of some of the material collected.

Meeting Date: May 17, 2007

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CLUB NEWS

The Auction/Potluck – 2007

What a night!! The fun began early as members and guests arrived to enjoy the social hour and examine the auction table for bidding choices, and the silent auctions tables for bargains and treasures. John LaGrange had made “Dave’s Punch” which was available along with wine and soft drinks to set a mellow mood.

The almost 50 attendees brought their delicious potluck dishes – no fast-food stuff – wonderful salads, side dishes and entrees. In addition there were scrumptious desserts waiting till the end of the meal and the dessert break in the auction.

Promptly at 7 p.m. auctioneer Carole Hertz announced the beginning of the voice auction. A round of applause was given to Wes Farmer for this his twentieth consecutive year as host of the Club auction/potluck!

There were some wonderful shells for bidding for this fun-loving group. Most all specimens in the auction this year, as last year, were from the Twila Bratcher-Critchlow and Billee Gerrodette collections. Some of the outstanding specimens were *Haliotis dalli*, *Cypraea ostergaardi*, *Cypraea rashleighana*, *Trophon catalinensis*, *Centrifuga leana*, *Conus auratus* and *Cancellaria centrotia*. Books went very well, too, with Veron’s 3-volume *Corals of the World*, Abbott & Dance’s *Compendium of Seashells* and Olsson’s *Mollusks of the Eastern Pacific* bringing in big bids.

At the mid-point break, members and guests had their desserts while checking on the status of their silent auction favorites and joining the crush at the huge dollar sale which covered the large ping-pong table. It wasn’t easy to get them back to the bidding game when they were still hunting for bargains in dollar shells.

The auctioneer finally sold her last shell at 10:30 p.m. to the applause of the weary participants, many kindly remaining to help with the cleanup.

Many heartfelt thanks to the Club Board for all their work in preparing for and assistance at the auction, to Don Pisor for help in the identification and/or confirmation of auction material, to Jim Goldammer for always lending a hand with the silent auction and to the “gofers”, Emilia and Grant who delivered the shells to their new owners. And most of all – so much gratitude to Wes Farmer. It was a terrific evening!!

Two Annual Meetings Announced
COA and WSM

The annual meeting of the Conchologists Of America (COA) will be held in Portland, Oregon from August 1-5, 2007 at the Monarch Hotel & Conference Center. Early registration begins on July 29th with two tour choices offered before the convention begins. Hotel reservations must be made prior to June 14th to assure lodging.

Besides the five optional tours offered, there will be the opening ceremony, welcome reception, club sales, silent auctions and raffles, regular programs (not yet announced), shell show and judging, the bourse, voice auction and the banquet.

It will be a fun-filled convention. For further information contact, General Chairperson Joyce Matthys (joycematthys@aol.com).

The Western Society of Malacologists (WSM) will hold its 40th annual meeting in La Paz, Baja California Sur, México from July 25-28, 2007. It will be sponsored by Universidad Autónoma de Baja California Sur with accommodations arranged at the Hotel Perla.

The symposia are: Advances in Opisthobranch Research, Historical Perspectives in Mexican Malacology, Mollusc Aquaculture and Malacology and Conservation. There will also be general sessions of Contributed Papers and Posters. In addition there will be the traditional welcoming reception, banquet and special tour choices.

For further information, contact: WSM President Carlos J. Cáceres Martínez at: ccaceres @ uabcs.mx

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David K. Mulliner

MEMORIAL ISSUE

DAVID KING MULLINER

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Dave Mulliner, our long-time close friend, traveling companion, nature-lover, colleague and fellow member of the San Diego Shell Club, passed away early on the morning of 24 January 2007 at the age of 85. He died from a fall and the resulting head trauma. He is survived by his wife Margaret and their three children: Steven, Donna and Paul.

Dave was born in Twin Falls, Idaho on April 15, 1921. The family, with Dave and his older sister, moved to Glendale, California where they settled when Dave was only six months old. After high school in Glendale and a brief time in a community college, Dave attended UCLA for two years, but left in 1943 during World War II to join the Air Force, in which he served on B-24s as a gunner and photographer (Figure 1). His plane was shot down over Italy and he spent eight months as a prisoner of war in a stalag in Germany. He and two others managed to escape in 1945 and he got out of the service in October of that year.

He spent a year in Lake Tahoe living with an uncle to recuperate from the effects of the war and his imprisonment. While there, he and his uncle together built a vacation lodge. He relocated to San Diego in the summer of 1947 during summer session at San Diego State College and briefly met his future wife Margaret. In September of that year he transferred from UCLA to San Diego State College, now a university, on the GI Bill. It was there that Dave and Margaret, also a student began dating and they were married in November of that year. They had planned to wait at least six months, but Dave had found and rented a studio apartment and asked Margaret, "Why wait?" (They both graduated in 1949, Dave with a major in chemistry and a minor in physics. Dave's class was the first to receive Bachelor of Science degrees from San Diego State (pers. comm. M. Mulliner..

During their college years at San Diego State, Dave pursued his life-long interest in photography, which had started at the age of 13. For two years while in college



Figure 1. Dave Mulliner in gunner's uniform with his camera, taken in 1942. Courtesy of Margaret Mulliner.

and after graduating, Dave did freelance photography as a means of support. He photographed all the Blue Book Balls, weddings, graduations and football games. His wife Margaret tells how they would set up a dark room at the back of the stadium; she would get the names and

¹ Mailing address: 3883 Mt. Blackburn Ave., San Diego, CA 92111, USA.

addresses for sending the prints while Dave hurried to develop the film.

Dave and Margaret started going to Baja early in their marriage. Dave mentioning in an interview that "Peggy and I would go down to Baja on my Harley-Davidson motorcycle. We'd go with another couple and take the dirt road to Punta Banda. The paved road ended at Maneadero in those days and you rarely saw other Americans. We pretty much had it to ourselves. All we would take with us was a skillet, a fishing pole, a pound of bacon and some snorkeling gear. It's all we needed, there were so many fish, abalone and lobster!" (Herrmann, 1985).

In early 1950 Dave joined the Air Force Reserves and was called up in May 1951 during the Korean War. Dave, with Margaret and their baby Steven, relocated to March Air Force Base in California where the family remained until February 1953 when Dave left the service as a Master Sergeant with new baby, Bruce, the second of what would be their four children.

On graduation in 1949, Dave joined the San Diego Gas and Electric company (SDG&E) as a junior chemist becoming a senior chemist in 1966 (Anon., 1970). During his career there he became a specialist in geothermal energy. He designed and constructed the controls and instrumentation at SDG&E's first liquefied natural gas plant in Chula Vista. He was awarded several patents on liquid natural gas (LNG) (two US patents and four foreign patents on cryogenics). And, in fact, was the one who researched and created that all important warning odor we smell when the gas is leaking. In 1976 he was named senior engineer in Gas Maintenance (Anon., 1982). He worked at SDG&E 33 years until his early retirement in 1982, after which he became an LNG consultant for ten years (Figure 2).

Dave and Margaret joined the San Diego Shell Club (SDSC) in 1965 and we first met the following year when Dave became president of the Club. He was a very kind, talented man of many varied interests and hobbies. His primary interests, which brought him to the Club, were his love of photography, diving and travel.

In the 1960s the Mulliner and Hertz families often traveled together to San Felipe in Baja California, all eight of us actually living in the Mulliner camper. It was a bit cozy. Sleeping arrangements were creative and meals were definitely buffet style (Figure 3). And Dave could do anything. When we, often with Joyce Gemmell who lived in San Felipe, were out in the middle of the desert traveling to an unpopulated beach for collecting and the motor on the truck or dune buggy died, Dave would get out, spread a cloth on the ground, take apart



Figure 2. Dave and friend at work in 1988. Courtesy of Margaret Mulliner.

the carburetor, rinse it with gasoline, put it back together again, and off we would go to the deserted beach for exciting collecting! If there were problems, Dave was the man to have with you. It's no wonder that he later received the sobriquet "Baja Dave."

Wherever Dave went he had his camera. If we found something unusual on the beach, we called Dave to take a picture of it (Hertz & Mulliner, 1974). He was always willing to see something different, take a photo and learn something about the new find.

When the publication *The Festivus* was born in 1970, Dave was active in its initial survival and he was the person who took one of the first photos it published in 1972. He later became the staff photographer of *The Festivus* until his retirement from that position in 2003. We often said that he was the only staff photographer that made house calls! In all those years, he never charged for his work except for the costs of materials.

His magnificent photography is also found in other books and periodicals. He did all the color plates for both Radwin & D'Attilio's (1976) *Murex Shells of the World* and Bratcher & Cernohorsky's (1987) *Living Terebras of the World* in addition to his photos in field



Figure 3. Camping in San Felipe, Baja California, México in 1973. Standing in front of Dave's truck are: l-r Dave, Joyce Gemmell, Margaret and Paul Mulliner, Ruth, Suzanne and Jules Hertz.

guides, opisthobranch magazines and scientific papers by several authors and later on the internet. Twelve of his underwater nudibranch photographs were displayed in the Natural History Museum in Paris and later in the Oceanographic Museum of Monaco (Anon., 1977). He was also a pioneer in microphotography, designing his own methods for capturing micromollusks, some less than a $\frac{1}{4}$ inch in length, on film (Mulliner, 1973c, 1980b, 2001) and was always willing to share his expertise with interested friends and colleagues.

In the late 1960s and early '70s, Dave would frequently spend Saturday mornings together with this novice snorkeler, diving off the jetty in the Entrance Channel in San Diego and sometimes in the ocean off Baja when the two families traveled together (Figure 4). Dave was mentor in all respects – he helped in the choice of wet suit maker, made her first weight belt and introduced her to the underwater world in a new way.

Diving became a big part of Dave's life as did his passion for nudibranchs. These combined interests took him to many exotic places to dive, photograph and in some cases find species of nudibranchs new to science. Two new species were described by him, three were named in his honor as well as one shelled mollusk, and many books and magazines include Dave's beautiful photographs of nudibranchs.

In 1971 he was part of the Ameripagos Expedition to the Islas Galapagos, his first major collecting trip (Mulliner, 1972d-f; 1973). Through the years he traveled, dived and photographed (above and

underwater) in exotic places such as the Galapagos, Red Sea, the Philippines (many times), the Solomons and Isla del Coco, Costa Rica. But I think his favorite spots, though, were in Baja California and beyond in México where he logged over 200 adventures (Herrmann, 1985) and where he and Margaret spent many a camping vacation by the side of the beautiful waters of the Gulf.



Figure 4. Snorkeling with Dave in 1968 off Bird Rock in La Jolla.

Dave has always had a very soft heart and helping people was one of his pleasures. On one of his early trips to the Philippines in a rural area on one of the islands, he was charmed by the kids that came to meet their dive boat. After making friends with some of the them, he was invited to their home for lunch. Dave decided that he would help this family to educate their children and he and Margaret have supported the children's education for many years continuing to the present. All of the children finished high school and three of the girls graduated college and became nurses and some went into food management.

During one of Dave's many trips to Baja, that time with Richard Herrmann and Ron McPeak, they came upon a serious accident on the road. It was through their efforts that a girl's life was saved and that girl, Bianca Soros, became a lifelong friend even joining Dave on dive trips after the several years that it took for her to heal from her injuries.

In 1968 the Western Society of Malacologists was formed. It had been for years the western division of the AMU, the American Malacological Union (now American Malacological Society). At an informal meeting of western professional malacologists and amateurs of which Dr. A. Myra Keen was a leading

figure, it was decided that the west would profit from having its own society rather than being the appendage of the AMU. Dave Mulliner became its first president and the first annual meeting was held at Asilomar, Pacific Grove, California. The opening address was given by Dr. Keen who explained the reasons for setting up the new Society. Twenty-five years later in 1992, Dave would again be president of the Society and the annual meeting celebrating this anniversary was held at Asilomar once again. The symposium that year was on the Cocos Island Expedition of which Dave was a part and he presented a paper on the opisthobranchs of Isla del Coco.

In addition to the Western Society of Malacologists, Dave was made a Research Associate at the San Diego Natural History Museum and was selected to represent the museum in the 1971 Ameripagos Expedition to the Islas Gal pagos where he studied the nudibranchs. As a result about 25 species of opisthobranchs were obtained (Sphon & Mulliner, 1972) and the new species, *Platydorís carolynae*, was described by Dave with co-author Gale G. Sphon (Plate 1, figure 1).

Three nudibranchs and one shelled mollusk were named in Dave's honor: *Tambja mullineri* Farmer, 1978,

from the Gal pagos; *Nembrotha mullineri* Gosliner & Behrens, 1997, from the Philippines; *Peltodorís mullineri* Millen & Bertsch, 2000, from southern California and *Parvanachius mullineri* (Poorman, 1983) (Plate 1, figures 3-6).

In his later years, Dave became active in a local AXPOW Group, of World War II, Vietnam and Korea veterans that met in the VA building in Mission Valley in San Diego. It was a social and therapy group and Dave became concerned that the stories of the older veterans from the Second World War would be lost. He began to document on video the stories of these survivors as they presented their experiences to the group. He made three copies of each of the videos, one for the person telling his story, one to the POW group's library at the VA building and one to the History Department at the University of California, San Diego.

Dave always had a smile and was always busy – if it wasn't photography, diving or traveling, it was woodworking, making furniture and remodeling the family home, or toiling in their garden accented with plants from many areas – especially Baja (Figure 5).

This was a man who loved life – and those of us who knew him loved him!

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**Two nudibranch species named by
David K. Mulliner and co-authors**

- Platydoris carolynae* Mulliner & Sphon, 1974 (Gal pagos)
- Crosslandia daedali* Poorman & Mulliner, 1981 (Sonora, Sea of Cortez) (Plate 1, figure 2)

Four species named in honor of Dave

- Tambja mullineri* Farmer, 1978 (Gal pagos)
- Nembrotha mullineri* Gosliner & Behrens, 1997 (Philippines)
- Peltodoris mullineri* Millen & Bertsch, 2000 (southern California)
- Parvanachis mullineri* (Poorman, 1983) (tropical eastern Pacific)

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Acknowledgments

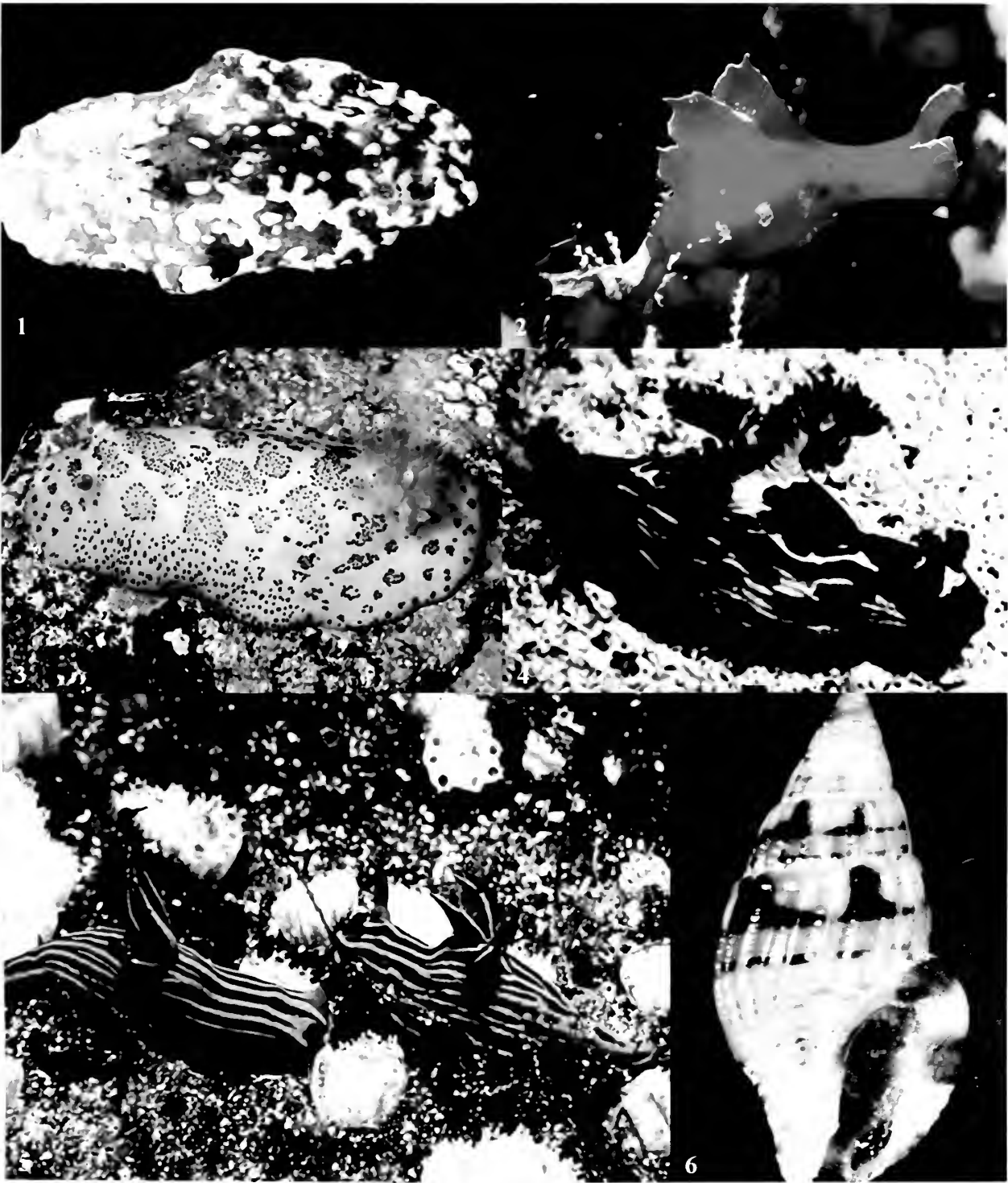
My appreciation to Margaret Mulliner who gave me her personal recollections as well as some photographs; to Bob Yin, Mike Miller and Hans Bertsch for helpful suggestions and to Alicia Hermosillo, Marc Chamberlain, Mike Miller and Carol Skoglund for photos of the species described by and named for Dave. And a special thanks to Suzanne Parlett for the beautiful cover design



Figure 5. Dave – always there with a smile.

Photo: courtesy of Margaret Mulliner.

Plate 1, figs 1-6. (1) *Platydorís carolynae* Mulliner & Sphon, 1974. Photo: Dave Mulliner (2) *Crosslandia daedali* Poorman & Mulliner, 1981. Photo: Alicia Hermosillo (3) *Peltodorís mullineri* Millen & Bertsch, 2000. Photo: Dave Mulliner (4) *Nembrotha mullineri* Gosliner & Behrens, 1997. Photo: Mike Miller. (5) *Tambja mullineri* Wes Farmer, 1978. Photo: Marc Chamberlain (6) *Parvanachis mullineri* (Poorman, 1983). Photo: Leroy Poorman. Courtesy of Carol Skoglund. →



"BAJA DAVE"

RICHARD HERRMANN

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February 2007

I am sitting in a hotel in Loreto, Baja California, where I am on assignment for Galatee Films. The job is filming and photographing blue whales around the rugged, shaply contoured offshore islands. In our first few days we've targeted a known whale hotspot, just south of Isla Carmen. On our way out to sea from Puerto Escondido each morning, I can see a couple of scattered palm trees on the distant shoreline just to the south and I recognize a tiny area on the coastline where I first camped in Baja about 25 years ago ... and I'm thinking about Dave. He was an important person in my life and one of the reasons I'm here, doing what I love to do the most.

I had a chance to go to Baja with Dave Mulliner in his camper for the first two of many Baja trips I have taken over the years. I was in my late 20s, but was still searching for my ultimate career path. Dave Mulliner was the perfect mentor for me in that time. He was a very generous man who had a wealth of information about diving, natural history, photography and Baja California that was astounding. I asked Dave a lot of questions in those days, and was like a sponge that absorbed his incredible knowledge. I never got tired of Dave's stories and he never seemed to be bothered by my incessant questions, like, "Hey Dave, what kind of plant is that?" or "Dave, when did you first start coming to Baja ... what was it like in those days?"

Dave could fix anything, and his patience to do so was unbelievable to a non-mechanical guy like me. One time I was in a separate vehicle with a couple guys towing a boat. Somehow the ball head had gotten loose and worked its way out of the trailer hitch. The boat finally came off to hit the road being dragged along only by the safety chain. Luckily this happened on a flat stretch, and not on a dangerous curve in the road. The

threads on the ball head were almost unregognizeable, they had been worn smooth and shiny. Well, the amazing Dave actually took a rattail file from his tool kit and re-filed the theads by hand to salvage our trip. It only took him about 8 hours to do it!!

Dave's stories of his initial trips to Baja were amazing to me. He painted a picture of a land that was virtually untouched. Fish populations that literally exploded on the surface for miles. Remote, beautiful campsites, and a sparse population of warm and friendly people. I can remember coming down the mountains from San Ignacio towards Santa Rosalia with Dave and Peg and seeing, for the first time, the famous Sea of Cortez I had only dreamed about. In the distant glassy surface, I could see whale blows. Those where magical trips.

I remember the near tragedy of finding two young people on the side of the road near Guerrero Negro. Ejected from their vehicle, a young girl lay bloody next to the road with life-threatening injuries. Dave took charge, and as a team we helped those young people get to a hospital and stayed with them to make sure they were flown safely out of Baja to the US. We all felt good about what we did. The young girl, Bianca, was very thankful and stayed in touch with Dave for years after. She even joined us for a Baja trip a couple of years after the accident!

In his later years, Dave told me he was through with Baja and wasn't going anymore. I was saddened at first, but then realized that he had seen Baja as good as it ever was and was getting worn down a bit by the mounting problems of securing a campsite, more people asking for money and dwindling fish and mollusk populations. Then I understood.

Dave Mulliner was a unique and talented individual who gave those of us fortunate to know him well something we carry with us forever. He will be missed.

A LETTER TO DAVE

BOB YIN

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Figure 1. At Moalboal, Philippines, 1987. Marge & Ken Lindahl, Margaret and Dave Mulliner, Bob Yin, Bianca Soros, and Ralph Richey.

"Dear Dave:

We were friends for sooooo long that I can't remember the whens and wheres. Our interests in sea shells, photography and diving led to many adventures and memorable trips to the Philippines and to Baja California and I will never forget them. I shall never



Figure 2. Dave and Bianca Soros at Batangas, Philippines, 1987.



Figure 3. Dave at Batangas, Philippines in 1987.



Figure 4. At Moalboal, 1985. Ralph Richey, Dave, Linda Sjolie, Teresita Shaarp and Bob Yin.

forget how much advantage I took of your skills and knowledge in your workshop, traveling, camping, sailing and diving. And, you were always ready to "HELP" any of my needs. Thank you for all the great times we had and I shall always miss you!

With much love!
Bob Yin"

IN MEMORIAM DAVID K. MULLINER: FOND THOUGHTS OF A GENTLEMAN

HANS BERTSCH

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There is a meandering cirio plant growing in La Jolla. Many years ago Dave planted a specimen of this Baja California icon in his backyard. Far from its unique natural habitat, it has rooted and grown well under the care of Dave and Margaret. So too, have many of us been nourished, guided and inspired by the friendly tutelage and respect of Dave.

We know his WW II service record (Army Air Force, shot down, prisoner of war, escapee!) which helped mold him as a gentle man. Maybe it was his way of making lemonade from lemons. Even amidst sadness and personal tragedies his spirit uplifted. My visits to him in the hospital burn ward, where he was recovering from life-threatening scalding by liquid nitrogen, always ended with Dave quipping, "Well, let's go diving soon."

Dave Mulliner was a discoverer, inventor, gadgeteer, and self-taught scientist. He used his talents for others, joining his quest of earth's marvels with theirs. He was one of the founders and first (1968) and 25th (1992) president of the *Western Society of Malacologists*, official photographer for *The Festivus* and Radwin & D'Attilio's *Murex Shells of the World*, and a scanning electron microscopist of minute shell parts without the electrons and vacuum. I remember his deserved pride in showing a young SDNHM marine invertebrate curator his camera accoutrements in his Vickie Drive garage-laboratory-dark room. Terry Gosliner, Mike Miller and Alan Grant called him "Mr. Fix-It For Dive Compressors" in the Philippines. In the Galápagos, he named *Platydoris carolynae* Mulliner & Sphon, 1974, and *Nembrotha mullineri* Gosliner & Behrens, 1997 was named for him.

My first non-Hawaiian scuba dive was 29 July 1978, a boat dive off Pt. Loma with Dave Mulliner. My dive log records our 95-foot dive, on a suspending-kelp rocky bottom, with lots of nudibranchs. We identified *Hermisenda crassicornis* (with eggs), *Peltodoris nobilis*, *Diaulula sandiegensis*, and *Tritonia festiva* on the

gorgonian *Lophogorgia chilensis*.

A few months later Dave, Aivars Berzins, and I dove his strategic lineup, Three Pole Reef. Of course there were the sponge-eating *Cadlina limbaughorum* Lance, 1962, and *C. luteomarginata*, and the cnidarian-eating *Flabellina iodinea*.

But most (un-)memorable about Aivars' Zodiac boat excursion was apres-dive. The engine died, and we rolled up and down, stillborn on the sea. Ocean swells are not calming to equilibrium. While Aivars and I were chumming, Dave ate what seemed to us a mayonnaise sandwich. Dave just smiled, hinting at his real empathy.

Many years later Dave and I did a shore dive into La Jolla Canyon. Two weeks before, I had found a creamy polyceratid nudibranch I couldn't identify underwater, so he and I went out to find it again. Yes, the same 15 mm long slugs on a kelp frond at the edge of a vast sandy expanse. Not really a Mission Impossible, nor luck, but just a simple search across known homogeneous terrain. As it turns out, the animals were light-colored forms of *Polycera atra*—probably because they had been eating *Membranipora* and not their usual prey bryozoan *Bugula* (see discussion and link at <http://slugsite.us/bow/nudwk133.htm>). Some of his underwater camera gear had flooded, so it was up to me to photograph the animals in situ. His attitude was, "Why get angry? We found them, didn't we?"

Dave would not have liked an In Memoriam for him without a discussion of nudibranchs, and he certainly would have preferred their pictures rather than several of him. Besides, a candid one is posted on the *Nembrotha mullineri* Nudibranch of the Week <<http://slugsite.us/bow/nudiwk59.html>>.

Nudibranchs are sweet, but family and friends are sweeter. Dave helped teach me that. Dave Mulliner was a very good man. I'm honored he considered me a friend—but I am not alone in that. Personal remembrances richly abound.

So there you go, Dave; our feelings are a mix of joy and sadness for what you were and did, and that your infectious spirit and exuberance are now memories.

That is your gift, and a most happy one at that. Thank you. Peace to you, and to your family and friends whom you made better by being you.

The Festivus.
American Museum of Natural
History
Received on: 05-23-07



THE FESTIVUS

A publication of the San Diego Shell Club

ISSN 0738-9388

Volume: XXXIX

June 14, 2007

Number: 6

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Annual dues are payable to San Diego Shell Club.
 Membership (includes family). Domestic \$20.00;
 Overseas (air mail):\$30.00; Mexico/Canada (air mail):\$20.00.

Address all correspondence to the San Diego Shell Club, Inc.,
 c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111. USA.

The Festivus is published monthly except December.
 The publication date appears on the masthead above.
 Single copies of this issue: \$5.00 plus postage.

Meeting date: third Thursday, 7:30 PM,
 Room 104, Casa Del Prado, Balboa Park, San Diego

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The Fascinating Lives of *Liguus* Tree Snails

Paul Tuskes will present an illustrated talk on the habitat,
 color forms, predation and population structure of these
 colorful tree snails, some exceeding 2.5 inches in length.

He will show some of the rarest species and will bring a
 part of his collection for viewing. Even some marine
 snails make sneak into his presentation.

Meeting Date: June 21, 2007

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CLUB NEWS

**Minutes of the San Diego Shell Club Meeting
May 17, 2007**

The meeting was called to order at 7:45 p.m. by President John LaGrange. Minutes of the previous meeting were accepted as printed in *The Festivus*. Treasurer Silvana Vollero reported that a successful Annual Auction had been held last month, which will sustain the expense of publishing *The Festivus* for another year. However, *The Festivus* editor Carole Hertz announced that with the new mailing rates it costs a minimum of 97 cents in postage, up from 63 cents, to mail a standard issue of *The Festivus*. This adds about a five hundred dollar yearly increase in mailing costs.

Wes Farmer again called for needed volunteer assistance in Botanical Society administration which manages tenant leases for organizations such as ours. Vice President Carole Hertz announced upcoming programs running through next January. Librarian Marilyn Goldammer urged new members to make use of our Club lending library, available at meetings.

This evening's program was presented by Harry Bedell. Club member, biochemist, photographer, world traveler and diver. His lifelong desire to visit Easter Island recently became a reality with visits in 2006 and early this year. Also known as Rapa Nui, the island covers only 66 square miles. The population of its single city is but 20,000. Isolated in the Pacific Ocean, its nearest neighbor is Pitcairn Island, 1300 miles distant. Ancient civilizations on Rapa Nui carved from volcanic rock enormous statues called Moai, representing the bodies of the deceased. His photos made us true arm-chair travelers.

But Bedell's real reason for this trip was to dive for shells. Accompanied by SDSC members Paul Kanner and Marty Beals, he dove at night to search for the local shells, all small. His underwater photographs revealed exceptionally clear water to a depth of 150 feet. The prize, at 110 feet, was two *Cypraea garciae*, named after local diver Michel Garcia, and endemic. These cowries feed on specific sponges only, which match them in color; 42% of the island's shells were endemic.

The speaker kept his audience spellbound with both his interesting story and with his photographs.

On Easter Island he told us that he felt as though he

was at the center of the world. His impassioned plea addressed the importance to conserve.

Door prize winner was student Christian Petroski, who drew his own number! Refreshments were provided by Judith Garfield, Silvana Vollero and Nola and John Michel. The meeting was adjourned at 9:10 p.m. Harry Bedell's Easter Island shell collection was available for perusal during the social time, which created quite a crowd.

Nancy Schneider

Additions to the Roster

Negus, Richard H. "Rick", 34001 Woodland Way, Carlsbad, CA 92008. Phone: 760-434-9808. E-mail: rnegus@adelphia.net

Tuskes, Paul, 3808 Sioux Ave., San Diego, CA 92117. Phone: 858-274-5829. E-mail: tuskes@aol.com

New Postal Rates Affect *The Festivus*

The new postal rates effective on May 14th greatly affect the budget of *The Festivus*. The First Class rate has only increased by two cents for letter mail from 39 to 41 cents for the first ounce. However, a new classification has been instituted based on the size of the envelope. The price for first class large envelopes is 80 cents for the first ounce. This increases our postal costs about \$500 a year. Increases in international postal rates are planned for the near future.

At this time there are no plans to increase the membership dues, but there may be such a need in the future.

**Mark Your Calendars for
The Annual September Party**

Debbie and Larry Catarius have again offered their home and garden for the annual September party. It will be held on Saturday September 15th with the festivities beginning 4:00 p.m.

Save the date, the party is always great fun!

AN ABNORMAL COLOR VARIATION IN JUVENILE
KATHARINA TUNICATA (WOOD, 1815)
(MOLLUSCA, POLYPLACOPHORA, MOPALIIDAE)

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The black chiton *Katharina tunicata* (Wood, 1815) is an important member of intertidal communities in many areas of the northeast Pacific (Dayton, 1975; Himmelman, 1978; Haderlie & Abbott, 1980; Paine, 1980; Dethier & Duggins, 1984; Duggins & Dethier, 1985). *Katharina* occurs primarily in the middle to low intertidal and is common from Alaska to San Luis Obispo County, California. Although this species has long been reported to range further south to Catalina and the Coronado Islands as well as into the northwest Pacific (e.g., Pilsbry, 1893-1994; Oldroyd, 1927; Ricketts et al., 1985; Kaas & Van Belle, 1994), recent efforts to confirm these records have been unsuccessful (D. J. Eernisse, personal communication). *Katharina* is a relatively large chiton, reaching lengths of at least 135 mm in northern California (TDS, personal observation), and is easily recognizable by a thick, black or dark brown (rusty brown in some juveniles), leathery girdle that overgrows all but the mid-dorsal area of the valves. *Katharina* individuals grow to a length of 25 mm during their first year (Hyman, 1967), with young chitons occurring in at least five different microhabitats during low tides (Stebbins, 1988). These microhabitats include a) cracks or crevices on exposed rocky surfaces, b) cracks or crevices under the blades of various species of kelp or other algae, c) on bare rock or coralline crusts under kelp blades, d) within kelp holdfasts, and e) under adult *Katharina*.

The "black" girdle is the major diagnostic feature used to identify *Katharina* in most monographs, natural history guides and taxonomic keys to Pacific coast chitons (e.g., Pilsbry, 1893-1894; Oldroyd, 1927; Hedgpeth, 1962; Ricketts & Calvin, 1962, 1968; Morris, 1966; Johnson & Snook, 1967; Burghardt &

Burghardt, 1969; Brusca et al., 1971; Abbott, 1974; Smith, 1975; Brusca & Brusca, 1978; Haderlie & Abbott, 1980; Putman, 1980; Kozloff, 1983, 1996; Ricketts et al., 1985; Kaas & Van Belle, 1994; O'Clair & O'Clair, 1998; Slieker, 2000; Sept, 2002; Eernisse et al., in press). A unique color morph of *Katharina* was found living within the holdfast of the kelp *Hedophyllum sessile* (C. Agardh) Setchell in Trinidad Bay, northern California (41°03'07" N; 124°07'51" W) in March of 1981. The individual was a juvenile chiton that measured 9.5 mm in body length and was characterized by a cream-white girdle (Figure 1). Coloration of the valves and all other diagnostic features were typical of the species.

It is unknown what caused the abnormal white coloration in this juvenile *Katharina* or whether it was a permanent or transitional developmental feature. The condition most likely represents a unique case of partial albinism in chitons in which the girdle lacks pigmentation while the outer layer of the valves (i.e., the tegmentum) is pigmented. In fact, comparison of the "white" *Katharina* juvenile with a slightly smaller normal "black" juvenile shows a very similar color of the tegmentum in these two individuals (Figures 1 and 2a). Perhaps most significant is that this observation provides evidence that the control of pigment production in the girdle and tegmentum of this species is decoupled at the genetic level. A second but less likely hypothesis for the cause of the unusual girdle coloration is that pigmentation may have just been delayed since the specimen was a juvenile found living amongst the haptera of a kelp holdfast, the latter representing a low-light situation that could possibly interfere with pigment production. However, as noted above, pigmentation in

the valves of this "white" *Katharina* appears to have developed normally. Additionally, all other *Katharina* juveniles less than 25 mm in length observed in the region, including those also occurring within holdfasts ($n = 9$) or in other cryptic microhabitats ($n > 200$; see Stebbins, 1988), possessed a typical dark girdle (e.g., Figure 2). Furthermore, another chiton that occurred along with *Katharina* in holdfasts, the lepidochitonid *Cyanoplax dentiens* (Gould, 1846), displayed normal coloration patterns. A third possibility is that the white girdle in this juvenile *Katharina* represented some form of pathology, although there was no direct evidence to support this hypothesis. For example, the chiton appeared healthy in the field and there was no indication of any tissue necrosis; the animal also displayed normal movement and feeding behavior in the laboratory. Although several other genera of Pacific coast chitons (e.g., *Dendrochiton*, *Lepidozona*, *Mopalia*, *Tonicella*) commonly display variable girdle and valve coloration patterns, this is the only known record of color variation in *Katharina*.

ACKNOWLEDGMENTS

I am grateful to Kelvin Barwick for taking the digital photographs presented herein and to Doug Eernisse for providing helpful comments which greatly improved the final manuscript. I also thank Rick Brusca, Paul Delaney and an anonymous reviewer for suggestions on a much earlier draft of this note. Jesse Stebbins provided "field assistance" and moral support under inclement weather conditions.

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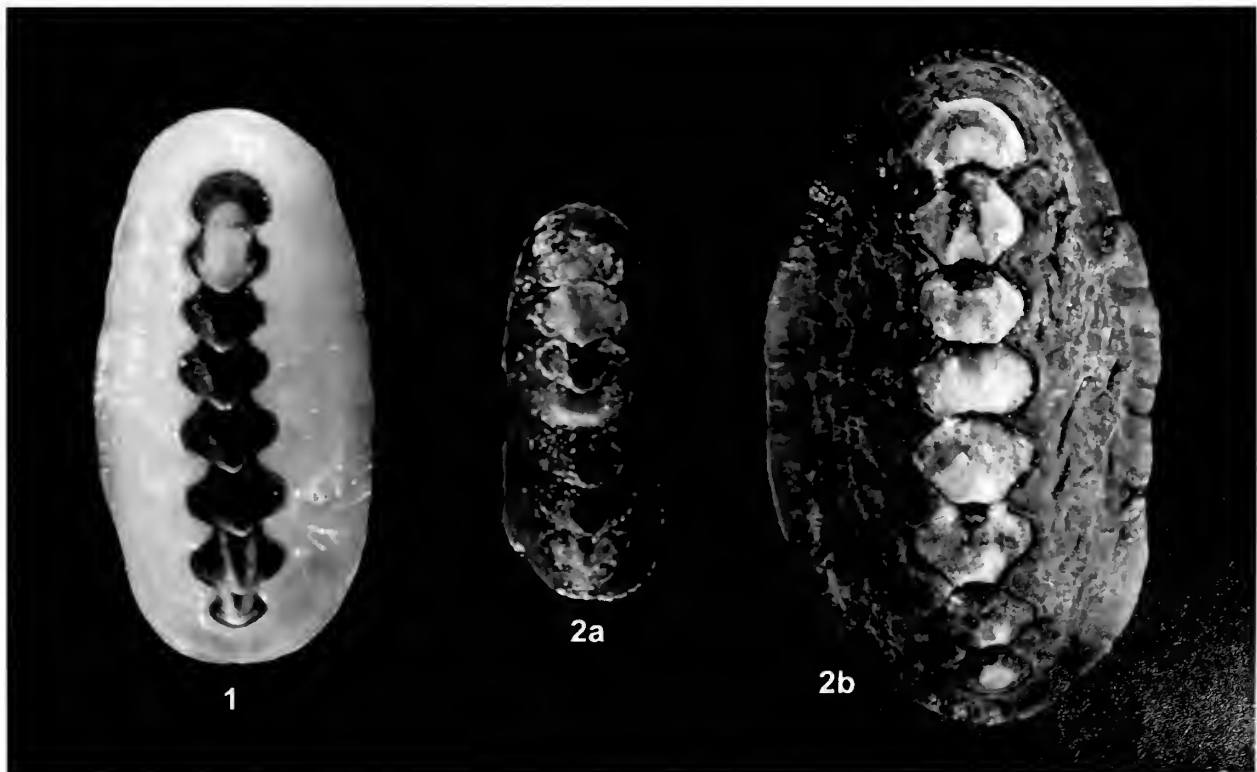


Figure 1. Abnormal "white" *Katharina tunicata* (Wood, 1815): 9.5 mm long juvenile chiton depicting cream-white girdle pigmentation (Collected by T.D. Stebbins, 4 March 1981, Trinidad Bay, Humboldt County, northern California, USA; Cat. No. TDS-MP64).

Figure 2a, b. Normal "black" *Katharina tunicata* (Wood, 1815): (a) 7.0 mm long juvenile chiton depicting typical dark girdle pigmentation (Collected by T.D. Stebbins, 6 June 1981, Luffenholtz Beach, Humboldt County, northern California, USA; Cat. No. TDS-MP76); (b) 25 mm long chiton with typical dark girdle (Collected by T.D. Stebbins, 4 March 1981, Trinidad Bay, Humboldt County, northern California, USA; Cat. No. TDS-MP65).

WHA' HAPPEN?

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In February of this year, Bob Yin, of La Jolla, California, called me saying he had a strange shell with attachment and wondered if I would be interested in seeing it. I knew that if Bob, an experienced diver and underwater photographer, thought something was of interest I would too. He wondered also, if the *The Festivus* might want to publish his find.

The next day Bob brought over a specimen of *Murex pecten* Lightfoot, 1786, the Venus Comb Murex, with one of its spines having grown through another shell (Figures 1, 2). The *M. pecten* with its attachment was from his brother Victor Dan's Collection and was found in 1996 by a fisherman in Cebu, Philippines.

The beautiful live-collected *M. pecten* specimen with operculum is 128 mm in length and the attached shell is 9.5 mm L. As per Bob's wishes this oddity has been donated to the Invertebrate Zoology Collection of

the Santa Barbara Museum of Natural History (SBMNH 83202).

Bob and I thought the little speared shell appeared to be either a *Turritella* or a turrid, but we could find nothing in Springsteen & Leobrera's *Shells of the Philippines* that seemed to have a spire like the impaled attachment.

I finally brought the curiosity to Don Pisor of San Diego, a very knowledgeable collector and dealer, to see if he could identify the juvenile victim. Don was sure it was a *Turritella* but couldn't identify it to species. The spire did not resemble *Turritella terebra*.

The Festivus was certainly interested in showing its readers this oddity. How does a spine continue to grow through another shell? As one can clearly see, the speared juvenile shell is close to the base of the spine.

Can anyone solve this mystery?

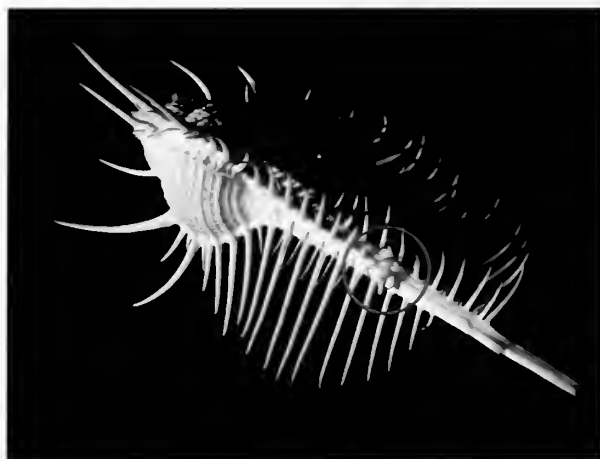


Figure 1. *Murex pecten* with attached shell encircled in red.



Figure 2. Closeup of the impaled juvenile shell

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BOOK NEWS

MARGINELLIDAE AND CYSTICIDAE OF THE WORLD: ATLAS WITH OVER 2600 PHOTOS

By: Tiziano Cossignani. 2006.

Hardcover, 408 pages, in Italian with an English Introduction.

Publisher: Mostra Mondiale Malacologica, Cupra Maritima

Price: £160.00 | approx. \$321/€235

We have been updating the curation of some molluscan families in the collection of the Marine Invertebrate Department at the San Diego Natural History Museum (SDNHM). We began working on the Marginellidae/Cysticidae holdings after the Scientific Librarian, Margaret Dykens, generously ordered the new Cossignani book, *Marginellidae and Cysticidae of the World* (Figure 1).

We found the photographs in this new book to be superb. Most species are shown in at least two views, dorsal and apertural, clearly showing labial dentition, siphonal notch when present, and columellar plicae. Many species are shown with up to six photos to beautifully illustrate variation in color and pattern; some thirty photos show living animals and others are copies of original paintings and drawings of the shells. Each photo lists species name, general locality and size.

The book is laid out geographically (under West Africa, West Atlantic, South Africa, Indian Ocean and Pacific Ocean) and arranged by families within each section. Sections each begin with a list of species, (most separated by family) and the only place to find author and date for the species. Most sections also have a map.

The Pacific Ocean component is very broad. Within this section are subdivisions for the Philippines, New Caledonia, Hawaii and Japan. The rest of the areas are grouped together within families, though not by location, from Washington and California to the Galápagos and Chile and from China to Indonesia and Polynesia with one lonely species illustrated from Mauritius which belongs in the section on the Indian Ocean.

Since this book lacks a text with descriptive species characteristics, distributions, and synonymies, Cossignani offers other references in which the marginelliform shells are treated such as Coover and Coover's 1995 generic monograph. A limited list of Principal Synonyms is given at the end of the book; we were unable to find some species names in this list.

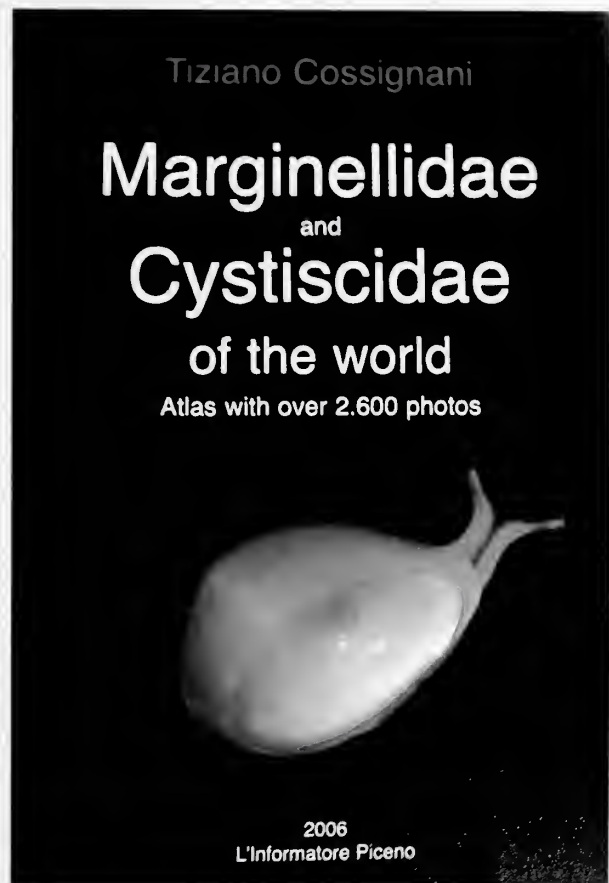


Figure 1. Cover of new book by Cossignani (2006).

Also a Photo Index at the back of the book can be used as an index to the species. It's the fastest way to find a species!

Some problems arise in using these lists. *Granulina lachrymula* is listed in bold in the Photo Index but there is no photo of the species. *Gibberula phrygia* from the Galápagos is listed as a *Persicula* in the Photo Index but as *Gibberula* under the three photos of the species

on pp. 310 and 311.

We also found other problems such as one on page 308 in which a specimen of *Plesiocystiscus jewettii* (Carpenter, 1857) is shown with labial denticles. The generic description of *Plesiocystiscus* in Coover & Coover (p. 66) states "lip thin anteriorly, gradually thickening toward the shoulder, smooth, lacking denticulation or lirae." One of the two illustrations in Cossignani has a thickened outer lip with denticles. The other specimen illustrated is poor and these features cannot be discerned.

Sometimes a text is really needed. In attempting to identify a *Marginella* from South Africa, two species in Cossignani looked very much alike – *Marginella piperata* Hinds, 1844, and *M. rosea* Lamarck, 1822. Examination of Kilburn & Rippey (1982, p. 142, pl. 27, figs. 10, 11) was necessary to determine which species we had. *Marginella rosea* is described there as "shell resembles *piperata* but larger, with a shallow but distinct notch in the outer lip below shoulder level." We

had our species.

Although this is not the easiest book to use because of its layout and the lack of text to complement the illustrations, it is a book of magnificent photographs of world-wide marginelliform shells with considerable information. A book of this kind has not been previously available – one which will bring a new appreciation for the beauty of this group of mollusks

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Carole M. Hertz and Barbara W. Myers

Figure references to "Fun at the SDSC Auction 2007"

Top row (l to r): John LaGrange making the punch, Marilyn Goldammer, Linda LaGrange, Herb & Mella Webster, John Jackson, John "Duffy" Daughenbaugh.

Second row (l to r): Bill Schneider, Debbie and Larry Catarius, George Kennedy, David Waller, Emi & Bruce Kemp

Third row (l to r): Carole Hertz & Silvana Vollero, Ron Deems, Jules Hertz, group at dollar table.

Fourth row (l to r): Richard Herrmann, Jim Goldammer, bidders (l-r) Harry Bedell, Bill Schneider, David Waller, Paul Kanner, Barbara Myers, Chase Parlett.

Bottom row (l to r): Perusing the auction table (Rosemary Pierce, Debbi Levin, Don Pisor, Duffy Daughenbaugh, Silvana Vollero), Ginny Herrmann, host Wes Farmer, Auctioneer Carole Hertz →

All original photos by Wes Farmer. Plate designed by Suzanne Parlett



The Festivus.
American Museum of Natural
History
Received on: 06-20-07

Volume: XXXIX

July 12, 2007

Number: 7

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 Membership (includes family). Domestic \$20.00;
 Overseas (air mail):\$30.00; Mexico/Canada (air mail):\$20.00.

Address all correspondence to the San Diego Shell Club, Inc.,
 c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111, USA.

The Festivus is published monthly except December.
 The publication date appears on the masthead above.
 Single copies of this issue: \$5.00 plus postage.

Meeting date: third Thursday, 7:30 PM,
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What happens to dead whales at the bottom of the sea?

Greg Rouse, Professor and Curator of Benthic Marine Invertebrates at Scripps Institution of Oceanography, will present a fascinating program resulting from his deep-sea re-

search in Monterey Canyon. He will talk on whalefall fauna such as *Osedax*, an extraordinary bone-devouring worm, which is one of the creatures found on a series of whalefalls.

Meeting Date: July 19, 2007

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CLUB NEWS

**Minutes of the San Diego Shell Club
June 21, 2007**

In the absence of President John LaGrange, Vice-President Carole Hertz, called the meeting to order at 7:45 p.m. A guest was introduced: Ann Tuskes, underwater photographer, adventurer, and wife of speaker, Paul Tuskes. The minutes of the previous meeting were amended to read September 22, instead of September 15, for the September Party. The minutes were then approved as amended. Treasurer Silvana Vollero reported that the treasury is still sound. Wes Farmer, Botanical Society Representative, happily reported that a ten foot square projection screen is to be installed in our meeting room. Also of note was that the Rose Society is now being charged a large fee for the room in which they hold their annual show.

Carole introduced our evening's speaker, Paul Tuskes, a new member of our society. The subject of his presentation was the Florida tree snail, *Liguus*.

This attractive snail has a distribution from Cuba and Hispaniola (Haiti and the Dominican Republic) northward to the southern tip of Florida, including the Florida Keys. There are thought to be four or five species, but some researchers consider as many as eight different species. The animals live to be six years old, their growth lines evident on their whorls. Their life is lived in, or at the edge of, the hammock, grazing algae, fungi, and lichens on the smooth bark of the hardwood trees. Calcium, necessary for their shells, is derived from calcium-based soil, such as old coral. It had been thought that *Liguus* arrived at various locations, rafted in on debris. Paul's research revealed that they cannot tolerate any salt water, and he theorizes that they instead were carried in by locals.

A drawerful of varied, colorful *Liguus* attracted the attention of an inquisitive audience. Some of the individual shells were passed around for more careful inspection. A steady stream of questions kept the evening lively as we all learned more about tree snails.

Jules Hertz won the evening's door prize, and the meeting was adjourned at 9 PM. The discussion about *Liguus* continued as we enjoyed our coffee with cake and cookies, provided by the Hertzes and David Waller.

Nancy Schneider

An Announcement from José H. Leal

Dr. Leal, in a note to Shell Club members, announced the preparation by The Bailey-Matthews Shell Museum, current publisher of *The Nautilus*, "...to post online back issues [of *The Nautilus*](from as early as 1886) on an open-access basis. This will enable researchers and shell enthusiasts everywhere to access otherwise very rare, old issues of the journal; open-access to old issues will promote the journal, the Museum, and ultimately improve the global flow of malacological information."

This is an ambitious project and will certainly be very good news to many of our members.

Changes to the Roster

Barwick, Kelvin, Oceanside Biology Laboratory, 3500 Great Highway, San Francisco, CA 94132. Phone: 415-242-2201. E-mail: kbarwick@sfwater.org
Beals, Marty, Abbey Specimen Shells, 640 S. Isis Ave., Inglewood, CA 90301.

The Annual September Party Date Changed

The date of the September party at the Catarius' home had to be changed to Saturday Sept. 22nd due to schedule changes. Festivities will begin at 4:00 p.m. A map will be included with the August issue and there will be a potluck sign-up sheet at the July meeting.

Save the date, the party is always great fun!

New Postal Rates Affect *The Festivus*

The new postal rates effective on May 14th greatly affect the budget of *The Festivus*. The First Class rate has only increased by two cents for letter mail from 39 to 41 cents for the first ounce. However, a new classification has been instituted based on the size of the envelope. The price for first class large envelopes is 80 cents for the first ounce. This increases our postal costs about \$500 a year. Increases in international postal rates are planned for the near future.

At this time there are no plans to increase the membership dues, but there may be a need in the future.



THE FESTIVUS

A publication of the San Diego Shell Club

ISSN 0738-9388

Volume XXXIX

July 12, 2007

Number 7



Twila Bratcher Critchlow
MEMORIAL ISSUE

TWILA BRATCHER-CRITCHLOW (1911-2006)

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Accomplished shell collector, master diver, and published expert on the family Terebridae, Twila [nee Langdon] Bratcher-Critchlow passed away on December 25, 2006, in La Jolla, California, at age 95. Twila accomplished much in her life, excelling in many areas of interest. She is fondly remembered by her many friends around the world.

Twila was born on 29 November, 1911, in Smoot, Lincoln County, Wyoming. She and her sister Billee, five years younger, were the only children of adventurous parents who were in the restaurant business. Their father took the young Langdon girls on an interstate tour in an early version of a motor home. After Twila and Billee finished college, the Langdon family lived in Lewiston, Idaho, where their parents owned a restaurant and both sisters were for a time also engaged in the restaurant management.

In Lewiston, Idaho, Twila met and married her husband, Ford Bratcher, who owned the local movie theater. Ford and Twila moved to southern California after World War II, where they resided first in San Diego, and then for many years in the Hollywood Hills, where their pool-side home overlooked the San Fernando Valley. In California, Ford became the owner of theaters in Riverside County and the Starlight Drive-In in El Monte (Cardone, 1995) (Figure 1). Ford did not share Twila's interests in diving and shell collecting, but he encouraged her many interests and is remembered as a good host to her friends at their home. Ford Bratcher died at the age of 81 in 1991.

In September 1993, Twila married Tom Critchlow, a longtime friend of 20 years. In order to live closer to her sister Billee Gerrrodette, she and Tom moved to La Jolla in the San Diego area in November 1996, where they lived in their high-rise condo across the street from the ocean. During her years with Tom in La Jolla, Twila survived a stroke but was soon again traveling with Tom, along with Billee and Bob Gerrodette. During this



Figure 1. Twila, and Ford Bratcher with Shaggy, from a color slide taken at the AMUPD meeting in June 1967. Photo: Courtesy of Carole & Jules Hertz.

time they kept all of their friends up to date with annual greetings that included brief reports and photos of their travels (Figure 2).

Early activities in California

During her early years in California, Twila worked for a time in the management of her husband's theaters and at the Walker-Scott Department Store in San Diego, where she also doubled as a model for fashion shows (Cardone, 1995) (Cover photo and Figure 3). Other interests during the 1950s led her to become an award-winning journalist, serving as president of the Southern California Women's Press Club (Cardone, 1995). She continued as a contributor to the travel section of the Los Angeles Times. Twila also became a licensed pilot of small aircraft, but by the time I met her in the 1960s she was no longer active as a pilot.

Swimming and diving

Twila and her sister Billee always considered themselves not only sisters, but as their best friends with similar interests. From their early days, Twila and Billee were active swimmers. According to Hlebica (1999), while still in their 20s, the sisters made their debut as rough-water swimmers in their home state of Idaho by bracing 15 miles of the wild Clearwater River — equipped only with masks, fins, and their determination. The sisters also performed water ballet in a professional synchronized swim team. Both Twila and Billee continued their physically demanding aquatic life in southern California, where they competed in the annual La Jolla rough water swim and became breath-holding skin divers.

Coinciding with the emergence of SCUBA diving, Twila in 1953, inevitably became a certified diver. Along with her sister Billee and three friends, she joined a commercial diving school, the Sparling School of Deep Sea Diving, run by Ellis R. Cross, then of Long Beach, California (Cross, 1993) (Figure 4). His diving school provided what was probably the first organized recreational diving class in the United States. Twila was the prize student of this first class. She also received training in SCUBA under diving pioneer Conrad Limbaugh, the first diving safety officer at Scripps Institution of Oceanography (Hlebica, 1999). When Twila and Billee learned to dive, women divers were exceptionally scarce. Because the elite men's free-diving club, the San Diego *Bottom Scratchers*, excluded women, Twila, Billee, and two other *Bottom Scratcher* wives formed the *Sea Nymphs*, a women's only diving club (Cardone, 1995) (Figure 5).

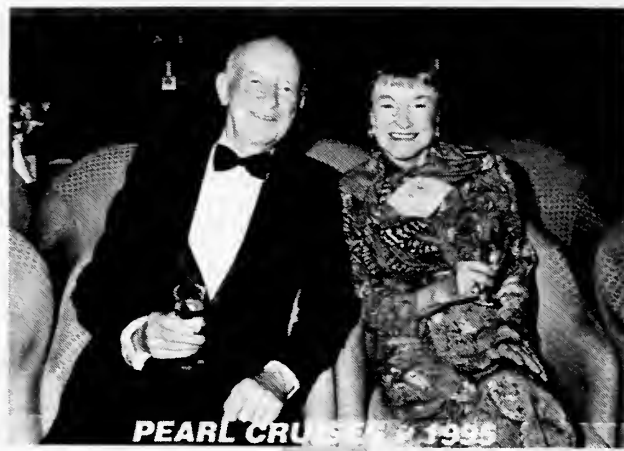


Figure 2. Twila and Tom vacationing in 1995.



Figure 3. Twila as a model in the early years. Photo: Courtesy of Tom Critchlow.

Malacological interests

Like many divers, both Twila and Billee became interested in collecting shells as a hobby. This interest started with the collecting of abalone for the dinner table, but Twila soon became a dedicated shell collector once she acquired a copy of the first (1954) edition of *American Seashells* by Tucker Abbott (1954). Their



Figure 4. "Billee and Twila beside their scuba diving instructor. They were the first female scuba divers. Taken about 1950 when they used iron helmets." Photo and caption courtesy of Tom Critchlow.

interests in shell collecting were encouraged by their diving instructor Ellis Cross, who later moved to Hawaii, where he became a mainstay of the Hawaiian Malacological Society. Their friendship with Cross continued and Twila later made many shell-collecting trips to Hawaii and became a regular contributor to the *Hawaiian Shell News*. Cross, in turn, wrote two of the biographical accounts about Twila for the *Hawaiian Shell News* (Cross, 1968, 1993).

Shell clubs in southern California were very active in the late fifties and early sixties, coinciding with the publication of the first edition of *Seashells of Tropical West America* by Myra Keen in 1958. Twila joined the Conchological Club of Southern California in May, 1960. She served as president of the CCSC in 1966 and again in 1988, and was later bestowed with honorary membership. Twila and her husband Ford hosted numerous shell club events at their home, usually including the annual Christmas party; she also volunteered for other club functions and provided self-collected shells for club auctions.

Twila was active in many other malacological organizations, included the Western Society of Malacologists (president 1972), the Conchologists of America, American Malacological Union (now the American Malacological Society), the Pacific Shell Club (the CCSC has now merged with the Pacific Shell Club to form the Pacific Conchological Club), the San Diego Shell Club, the Hawaiian Malacological Society, and the now defunct Santa Barbara Malacological Society. I first met Twila in the 1960s at the annual meetings of the



Figure 5. Billee and Twila in 1953, members of the Sea Nymphs dive club. Photo: Explorations 6(2) Fall 1999. Photo: Courtesy of Scripps Institution of Oceanography.

Pacific Division of the American Malacological Union (later to become the Western Society of Malacologists).

In the period from 1965 to 1972, much of Twila's spare time and many of her extra shells were donated to blind children in cooperation with the Braille Institute of America, for which she was chair of the Braille Shell Project, which was organized within the Pacific Shell Club (Figure 6). Her story *Raptures of the Deep*, which described her experiences with shells, has been distributed to blind children throughout the world as part



Figure 6. Twila with Braille group. From Cross, 1968. Caption reads "Editor Jean Kentle and contributing author Twila Bratcher listen to Roberta DeMond read the story, *Raptures of the Deep* from the Braille book, *Christmas and the Year Ahead*. Courtesy of the Braille Institute of America, Inc., Los Angeles.

of the Braille book *Christmas and the Year Ahead* (Cross, 1968).

Interest in Terebridae

Shells of importance for Twila's collection were self-collected and those that represented her world-wide interest in the families Muricidae, Conidae, Cypracidae, and Terebridae. She became particularly interested in the family Terebridae in the 1960s, having recognized that a major revision and a book devoted to that much neglected family had not been done. Her first publication efforts with Terebridae were collaborations with Robert Burch, which continued between 1969 and 1971. They assisted Myra Keen with the treatment of Terebridae in the second edition of *Seashells of Tropical West America* (1971). After Burch's untimely death, Twila commenced a collaboration on the Terebridae with Walter Cernohorsky, who had by then photographed many gastropod type specimens at European museums. Over the next fifteen years Twila also made trips to Europe to study the collections of Terebridae in some of the major museum collections. Twila was recognized as an accomplished amateur malacologist and was well treated at all the museums she visited, except at the Bishop Museum, where she reported that the late land snail worker Yoshio Kondo dismissed her as a mere "shell shuffler." Although Twila never had an unkind word for anybody, her account of that meeting was the one known exception to that!

After some 15 years of effort, when Twila had reached the age of 76, the book of Bratcher and

Cernohorsky, *Living Terebras of the World*, was published in 1987 by Tucker Abbott's publishing venture, American Malacologists. This was a remarkable accomplishment, an effort that would have been much more difficult without the newly available word processing programs. *Living Terebras* was not only a book useful for shell identification, but a full taxonomic revision, complete with synonymies and references to type localities and type material, with illustrations of type specimens for nearly all the species.

The Bratcher and Cernohorsky book has stood for 20 years as the ultimate source of information on the Terebridae. Only this year has there been another book: *Terebridae, A Collector's Guide*, by Yves Terryn (2007), which serves as a color-illustrated supplement to the original book of Bratcher and Cernohorsky. Terryn's book is dedicated "to Twila Bratcher and Walter O. Cernohorsky, for their pioneering work in Terebridae."

Collecting Expeditions

Twila's shell collecting interests eventually took her to numerous collecting localities worldwide, usually accompanied by Billee and other advanced divers. Localities visited included Tonga, Hawaii, Yucatan, Micronesia, Polynesia, west Mexico, Indonesia, Japan, Guantanamo Bay, Cuba, the Marquesas, Venezuela, Senegal, New Hebrides, Australia, Sri Lanka, Malaysia, South Africa, the Caribbean, Myanmar, Thailand and the Philippines (Abbott, 1973).

She also participated in shell-collecting expeditions organized by members of California shell clubs, including the Ariel Expedition to the Gulf of California (1960), the Ameripagos Expedition to Islas Gálpagos (1971) and the Am-Mela Expedition to the Solomon Islands (1978).

Accounts of these trips were written for the Hawaiian Shell News and slide-show programs were presented for the shells clubs of southern California. Twila took an interest in the native people in the places she visited; I remember one program in which she performed folk dances she had learned during her visit to Tonga.

Her diving and collecting activities continued well into her 70s and early 80s. She stayed fit with a program of exercise that included stationary cycling and swimming laps in her home pool. Late in her diving years she was an invited participant in the Western Australian Museum's September 1986 expedition to Rowley Shoals, and she also joined a survey of Astrolabe Reef, Fiji, in 1991, when she had reached the

age of 80 and was still diving.

Contributions to the program in malacology at the LACM

In her capacity as museum associate, Twila always obliged us by contributing specimens for the museum collection. She collected shell grit, providing us with samples that were later sorted by museum volunteers Jo-Carol Ramsaran, Edith Abbott, and Elizabeth Veal. These carefully documented samples have enhanced the micro-mollusk collection, greatly adding to its importance and providing a source of material for the future research of specialists in the small-shelled families.

Between 1966 and 1997, Twila donated over 13,000 lots of shells, most of which were received in unsorted condition. For the family Terebridae, these donations included nine holotypes and 76 paratypes (Groves, 2007). After her research efforts ended, she provided us with her painstakingly amassed reference collection of terebrids, which included most of the then known species, a total of 7,525 specimens in 2,007 lots. Her publications and a listing of the species she described are treated separately by Groves (2007), which includes a list of species that have been named after her.

Specimens of Liotiidae of interest to me were collected from shell grit from her most recent trips to Rowley Shoals and Fiji. Forthcoming descriptions of new species will result in additions to the number of species named after her.

Following up on an earlier commitment made in 1990, Twila in 1999 provided the endowment funding for a future research and curatorial position for the LACM Malacology Section, the *Twila L. Bratcher Chair of Malacology*. Over time, this endowment is expected to grow, which will eventually enable the position to be filled.

Other recent interests

In the mid-1980s, Twila spent more and more of her diving time engaged in underwater photography, in which she also excelled. In this endeavor she teamed up with Lynn Funkhouser, a professional underwater photographer and past president of the Chicago Shell Club. Unlike many divers who do only one thing at a time, Twila continued to collect shell grit samples for the LACM.

Along with her sister Billee, Twila also established a bequest to benefit the Scripps Institution of Oceanography and the Birch Aquarium, specifically to support coral reef ecology (Hlebica, 1999).

In 2005, Twila and Billee generously donated the remaining parts of their collections to the San Diego Shell Club for use in club auctions.

Twila excelled in all of her endeavors. She was gracious and unassuming, always kind and helpful to others. Rather than correct a fellow collector's unfamiliarity with Latinized names, she would smile and respond "you mispronounce it your way and I'll mispronounce it my way." She is greatly missed. In the words of Ellis Cross (1993), Twila was indeed a "National Treasure."

Acknowledgments

I thank Lindsey Groves of the LACM for obtaining copies of the biographic notes that have been published and for assistance in the preparation of this account. Special thanks to Twila's sister Billee Gerrodette, of La Jolla, California, for personal information about her sister. Noted underwater photographer and writer, Bonnie Cardone kindly facilitated contact with Leslie Leaney (President, Historical Diving Society), who provided an article about Twila from *Historical Diver*. Shannon Casey (Scripps Institution of Oceanography, Marketing Manager) provided a copy of SIO's *Explorations* that featured Twila and Billee and their bequest to that institution.

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MALACOLOGICAL CONTRIBUTIONS OF TWILA LANGDON BRATCHER-CRITCHLOW (1911 – 2006)

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Molluscan species named by Twila L. Bratcher

Accomplished shell collector, master diver, and Terebridae authority Twila Bratcher-Critchlow [nee Langdon] passed away on December 25, 2006, in La Jolla, California at age 95. Twila co-authored one epitoniid species and authored or co-authored 35 species of terebrid gastropods and only three species have been relegated to synonymy with previously described species. Species are listed in alphabetic order within families regardless of genus.

Abbreviations used herein: **AIN** = Auckland Institute and Museum, Auckland, New Zealand; **AMNH** = American Museum of Natural History, New York, USA; **AMS** = Australian Museum, Sydney, Australia; **ANSP** = Academy of Natural Sciences of Philadelphia, Pennsylvania, USA; **BM** = British Museum of Natural History, London, England; **CAS** = California Academy of Sciences, San Francisco, California, USA; **DMNH** = Delaware Museum of Natural History, Wilmington, Delaware, USA; **HUJ** = Hebrew University of Jerusalem, Israel; **LACM** = Malacology Section, Natural History Museum of Los Angeles County, California, USA; **MCZ** = Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA; **MNHN** = Muséum National d'Histoire Naturelle, Paris, France; **MORG** = Museu Oceanografico de Rio Grande, Rio Grande do Sul, Brazil; **NM** = Natal Museum, Pietermaritzburg, South Africa; **SBMNH** = Santa Barbara Museum of Natural History, California, USA; **SDNHM** = San Diego Natural History Museum, California, USA; **SU** = Stanford University, Stanford, California (collections now housed at CAS); **USNM** = National Museum of Natural History, Smithsonian Institution, Washington, DC, USA; **UZMC** = Universitetes Zoologiske Museum,

Copenhagen, Denmark; **WAM** = Western Australia Museum, Perth, Western Australia; **YPM** = Yale Peabody Museum, New Haven, Connecticut, USA.

Superfamily Epitoniioidea Berry, 1910 Family Epitoniidae Berry, 1910

billeeana, *Scalina* DuShane & Bratcher, 1965:160-161, pl. 24.
Type Locality: 2.4-3 m, southwest end of Isla Cerralvo, Golfo de California, Baja California Sur, México (24°09'N, 109°55'W).

Type Material: Holotype CAS 12799, paratypes in USNM, BM, 5 paratypes AMNH 128727, 220847 (*ex* N. Currin Collection), SBMNH 22208, LACM 1095.

Remarks: Questionably in the subgenus *Limiscala*? fide Weil & others (1999).

Superfamily Conoidea Fleming, 1822 Family Terebridae Mörch, 1852

albocancellata, *Terebra* Bratcher, 1988a:413-415, figs. 1, 9.
Type Locality: Plateau Chesterfield-Bellona Chalcal, Coral Sea (36°42'S, 158°59'E).

Type Material: Holotype & 1 paratype MNHN, 4 paratypes LACM 2829-2830.

Remarks: Incorrect latitude cited by Bratcher, 1988a, correct latitude estimated to be 21°S.

alboflava, *Hastula* Bratcher, 1988a:415-416, figs. 2, 5.

Type Locality: 15.5 m, off Sogod, Cebu Province, Philippines.

Type Material: Holotype LACM 2262, 3 paratypes LACM 2830, 1 paratype AMNH 222588, 1 paratype AMS C15235, 1 paratype ANSP, 1 paratype BM 1986261, 1 paratype CAS, 1 paratype MCZ 196166, 1 paratype MORG 24.809, 1

paratype NM 758/13690, 1 paratype MNHN, 1 paratype SDNHM 92523, 1 paratype USNM 859149, 1 paratype in collection of W.O. Cernohorsky (New Zealand), 1 paratype in collection of F. Dayrit (Philippines) [current whereabouts unknown], 1 paratype in collection of J. Marquet (Belgium) [current whereabouts unknown].

Remarks: Paratypes designated as being in the W.O. Cernohorsky Collection were never received by the donee (W.O. Cernohorsky, pers. comm., 2007) and are assumed to have been lost or retained in Twila Bratcher's personal collection which was donated to LACM in 1997.

allyni, *Terebra* Bratcher & Burch, 1970a:298-299, pl. 44, figs. 1-4.

Type Locality: 9.1-18.3 m, east shore of Isla María Madre, Islas Tres Marías, Nayarit, México (21°35'N, 106°26'W).

Type Material: Holotype CAS 13278, 2 paratypes CAS 13279, 1 paratype *ex* SU 9995 [now in CAS collection], 1 paratype LACM 1254, 1 paratype SDNHM 51248, 1 paratype USNM 679534, 1 paratype AMNH 154675, 1 paratype ANSP 316224, 1 paratype SBMNH 27142, 1 paratype DMNH 22421.

baileyi, *Duplicaria* Bratcher & Cernohorsky, 1982:64-65, figs. 5, 11.

Type Locality: 20 m, Guadalcanal Id., Solomon Ids. (9°25'S, 159°56'E).

Type Material: Holotype LACM 1970, 2 paratypes LACM 2823-2824, 1 paratype AMNH 206093, 1 paratype ANSP 358482, 1 paratype AMS C132464, 1 paratype CAS 60674, 1 paratype MCZ 290426, 1 paratype MORG 21.275, 1 paratype NM H-766, 1 paratype USNM 782262, 2 paratypes in collection of W.O. Cernohorsky (New Zealand), 1 paratype in collection of M. Marrow (Kew, Victoria, Australia).

Remarks: Paratypes designated as being in the M. Marrow collection are still retained by Mr. Marrow and will eventually be donated to the Victoria Museum, Melbourne, Australia (M. Marrow, pers. comm., 2007).

boucheti, *Terebra* Bratcher, 1981a:329-330, figs. 1-2.

Type Locality: 67-70 m, northwest of Cavite Province, Philippines (14°16'N, 120°31'E).

Type Material: Holotype MNHM, 1 paratype MNHM, 1 paratype BM 198019, 2 paratypes LACM 1364, 1 paratype USNM 782260, 1 paratype B. Parkinson Collection (Waipu, New Zealand).

Remarks: Paratypes designated as being in the B. Parkinson Collection are very likely in the Auckland Institute & Museum (B. Parkinson, pers. comm., 2007). Reassigned to the genus *Cinguloterebra* by Terryn (2007).

brandi, *Terebra* Bratcher & Burch, 1970a:296-297, pl. 44, figs. 5-6.

Type Locality: 9-18 m, Bahía Petalan, Guerrero, México (17°31.7'N, 101°27.57'W).

Type Material: Holotype LACM 1252, 1 paratype LACM 1253.

burchi, *Terebra* Bratcher & Cernohorsky, 1982:63, figs. 6-7.

Type Locality: 15-20 m, northern Mozambique Channel, north of Mayotte Id. (12°45'S, 45°18'E).

Type Material: Holotype MNHN, 2 paratypes LACM 1971, 2 paratypes in collection of W.O. Cernohorsky (New Zealand), 2 paratypes in collection of B. Tursch (Brussels, Belgium) [current whereabouts unknown].

Remarks: Reassigned to the genus *Hastulopsis* by Terryn (2007).

caddeyi, *Terebra* Bratcher & Cernohorsky, 1982:63, figs. 4, 12.

Type Locality: 3 m, Korere Village, Rabaul, New Britain, Bismarck Archipelago, Papua New Guinea.

Type Material: Holotype LACM 1967, 1 paratype LACM 2820, 2 paratypes in collection of P.T. Caddey (New South Wales, Australia) [current whereabouts unknown].

Remarks: Reassigned to the genus *Cinguloterebra* by Terryn (2007).

carolae, *Terebra* Bratcher, 1979a: 63-64, figs. 5, 7, 9, 11.

Type Locality: 54 m, off Punta Hughes, Bahía Santa María, Pacific Coast of Baja California Sur, México (24°45'08"N, 112°19'W) (Figure 2).

Type Material: Holotype LACM 1178, 23 paratypes LACM 1184, 2816-2818, 8 paratypes AMNH 186661, 222064 (*ex* H. DuShane Collection), 269432 (*ex* C. Skoglund Collection), 1 paratype ANSP 345789, 1 paratype CAS 59672, 1 paratype MCZ 288502, 1 paratype YPM 17717, 1 paratype SBMNH 51671, 1 paratype SDNHM 70581, 1 paratype BM, 1 paratype in collection of W.O. Cernohorsky (New Zealand), 6 paratypes in collection of C. Skoglund (Phoenix, Arizona) (pers. comm., 2007).

colorata, *Hastula* Bratcher, 1988a: 416, fig. 7.

Type Locality: Light House Beach, Augusta, Western Australia, Australia (34°20'S, 115°10'E).

Type Material: Holotype WAM 514-86, 1 paratype AMNH 222984, 1 paratype AMS C153006, 1 paratype ANSP, 1 paratype BM 1986283, 1 paratype CAS, 9 paratypes LACM 2263, 1 paratype MCZ 296167, 1 paratype MORG 24.810, 1 paratype NM K175/T3689, 1 paratype SDNHM 92524, 1 paratype USNM 859218, 2 paratypes in the collection of W. Anson (Australia) [current whereabouts unknown], 1 paratype in collection of W. Buick (Australia) [current whereabouts unknown], 1 paratype in collection of W.O. Cernohorsky (New Zealand), 4 paratypes in collection of M. Marrow (Kew, Victoria, Australia).

Remarks: Considered a columbellid by Terryn (2007).

connelli, *Terebra* Bratcher & Cernohorsky, 1985:93, figs. 2, 6

Type Locality: 116 m, off Umhlanga Rocks, Natal, South

Africa.

Type Material: Holotype NM B6307, 1 paratype NM C4715.

Remarks: Reassigned to the genus *Cinguloterebra* by Terryn (2007).

dorothyae, *Terebra* Bratcher & Burch, 1970a:297, pl. 44, figs. 7-8.

Type Locality: 13-20 m off Puerto de San Jose, Escuintla, Guatemala (13°52.58'N, 91°10.58'W).

Type Material: Holotype LACM 1250, 11 paratypes LACM 1251, 2 paratypes CAS 13281, 1 paratype ex SU 9993 [now in CAS collection], 1 paratype SBMNH 27141, 1 paratype SDNHM 51249, 1 paratype AMNH 154674, 1 paratype USNM 679482, 1 paratype YPM 12-15635, 1 paratype BM, 1 paratype DMNH 22422 (erroneously published as 22421 fide Bieler & Bradford, 1991), 1 paratype ANSP 316223.

Remarks: Treated as a junior synonym of *Terebra glauca* Hinds, 1877, fide Bratcher & Cernohorsky, 1987.

elliscrossi, *Terebra* Bratcher, 1979b:65-66, fig. 1.

Type Locality: 300 m, east side of Pearl Harbor, Honolulu, Honolulu District, Oahu, Hawaiian Ids.

Type Material: Holotype LACM 1257, 1 paratype LACM 2819, 1 paratype AMS C111658, 1 paratype BM, 1 paratype WAM, 1 paratype USNM 71899, 1 paratype in collection of the late E.R. Cross (Honolulu, Hawaii) [current whereabouts unknown], 1 paratype in collection of R. Schoening [current whereabouts unknown], 1 paratype B. Parkinson collection (Waipu, New Zealand), 1 paratype in collection of R. Schelling [current whereabouts unknown].

Remarks: Reassigned to the genus *Cinguloterebra* by Terryn (2007).

hancocki, *Terebra* Bratcher & Burch, 1970a: 299, pl. 44, fig. 11.

Type Locality: 15-18 m, off La Libertad, Bahía Santa Elena, Guayas Province, Ecuador (20°8.3'N, 81°0.2'W).

Type Material: Holotype LACM 1255, 2 paratypes LACM 1256, 2 paratypes CAS 13282, 1 paratype ex SU 9995 [now in CAS Collection], 1 paratype SBMNH 27143, 1 paratype AMNH 155886, 1 paratype USNM 678614, 1 paratype ANSP 316418, 1 paratype DMNH 51367, 1 paratype BM.

hertleini, *Terebra* Bratcher & Burch, 1970b:1-2, figs. 1-2.

Type Locality: 6.4-10 m, Bahía Academy, Isla Santa Cruz (= Indefatigable Id.), Islas Galapagos (0°46'16"S, 90°19'38"W).

Type Material: Holotype CAS 13222, paratype AMNH 157281, paratype ANSP 316670, paratype BM, 5 paratypes CAS 13223-13227, 1 paratype ex SU 9996 [now in CAS collection], paratype LACM 1288, paratype SBMNH 27147, paratype SDNHM 51962, paratype USNM 680212.

Remarks: Treated as a junior synonym of *Terebra jacquelineae* Bratcher & Burch, 1970, fide Bratcher & Cernohorsky, 1987. However, Boyko & Cordeiro (2001) note that *T. hertleini* was published one page earlier than *T. jacquelineae* and is therefore the oldest name available and becomes the senior synonym.

insalli, *Terebra* (*Triplostephanus*) Bratcher & Burch, 1967:7-8, pl. 2, figs. 1-3.

Type Locality: Eilat, Gulf of Aqaba, Southern District, Israel (29°32'20"N, 34°57'E).

Type Material: Holotype CAS 12946, 1 paratype CAS 10279, 1 paratype LACM 2814, 1 paratype MCZ, 1 paratype SBMNH 23729, 1 paratype BM, 2 paratypes in collection of D.C. Insall (Haifa, Israel) [current whereabouts unknown].

Remarks: Reassigned to the genus *Cinguloterebra* by Terryn (2007).

jacquelineae, *Terebra* Bratcher & Burch, 1970b:2, 4, figs. 3-4.

Type Locality: 18.3 m, Bahía Academy, Isla Santa Cruz (= Indefatigable Id.), Islas Galapagos (0°46'16"S, 90°19'38"W).

Type Material: Holotype CAS 13215, 14 paratypes CAS 13216-13220, 27536, 1 paratype ex SU 9997 [now in CAS collection], 1 paratype BM, 1 paratype USNM 680213, 28 paratypes LACM 1179, 1 paratype MCZ 271946, 1 paratype SDNHM 51963, 1 paratype AMNH 157282, 1 paratype ANSP 316671, 1 paratype SBMNH 27148, 1 paratype WAM, 1 paratype in collection of C. Skoglund (Phoenix, Arizona) (pers. comm., 2007).

knudseni, *Terebra* Bratcher, 1983:304, fig. 1.

Type Locality: Malawali Id., Kudat District, Sabah, Borneo, Malaysia.

Type Material: Holotype UZMC, 1 paratype ANSP 35249, 1 paratype USNM 658631, 3 paratypes LACM 1363.

macleani, *Terebra* Bratcher, 1988a: 415, figs. 3, 10.

Type Locality: East Cape of East London, Cape Province, South Africa (33°04.9'S, 27°54.0'E).

Type Material: Holotype NM D473/3687, 1 paratype NM D4809/T3688.

Remarks: Reassigned to the genus *Pristiterebra* by Terryn (2007).

mactanensis, *Terebra* Bratcher & Cernohorsky, 1982:63-64, figs. 1, 10.

Type Locality: 200 m, Punta Engano, Mactan Id., Cebu Province, Philippines.

Type Material: Holotype LACM 1968, 1 paratype LACM 2821, 1 specimen in collection of M. Marrow (Kew, Victoria, Australia).

marrowae, *Terebra* Bratcher & Cernohorsky, 1982:64, figs. 2, 9.

Type Locality: Intertidal, Cleaverville, Western Australia, Australia.

Type Material: Holotype LACM 1969, 2 paratypes LACM 2822, 2 paratypes in collection of P.T. Caddey (New South Wales, Australia) [current whereabouts unknown], 1 paratype in collection of W.O. Cernohorsky (New Zealand), 2 paratypes in Cooper Collection [current whereabouts unknown].

Remarks: Reassigned to the genus *Cinguloterebra* by Terryn (2007).

mozambiquensis, *Duplicaria* Bratcher & Cernohorsky, 1982:65-66, figs. 3, 8.

Type Locality: Off Chinde Id., Zambezia Province, Mozambique.

Type Material: Holotype NM H7843/T2541, 5 paratypes NM J2973/T2542, 566/T2543, B2137/T2544, H765/T2545, 1 paratype in T. Bratcher Collection (lost).

parkinsoni, *Terebra* Cernohorsky & Bratcher, 1976:137-139, figs. 17-21.

Type Locality: Nordup, New Britain, Bismarck Archipelago, Papua New Guinea.

Type Material: Holotype AIN TM-1347, 4 paratypes LACM 2260, 2828, 1 paratype DMNH 112104, paratypes in USNM and HJ, B. Parkinson Collection (Waipu, New Zealand), collection of H. Eker (Sanibel, Florida) [current whereabouts unknown], collection of O.K. McCausland [current whereabouts unknown].

Remarks: Reassigned to the genus *Myurella* by Terryn (2007).

paucincisa, *Terebra* Bratcher, 1988a:413, fig. 4.

Type Locality: 17 m, Grand Recif South, New Caledonia Group, New Caledonia (22°37'S, 166°51'E).

Type Material: Holotype and 12 paratypes MNHN, 1 paratype AMNH 222587, 1 paratype AMS C15234, 1 paratype BM 1986260, 1 paratype CAS, 4 paratypes LACM 2260, 2828, 1 paratype MCZ 296165, 1 paratype USNM 859148, 6 paratypes in B. Parkinson Collection (Waipu, New Zealand), 2 paratypes in collection of W.O. Cernohorsky (New Zealand).

Remarks: Reassigned to the genus *Strioterebra* by Terryn (2007).

pseudopertusa, *Terebra* Bratcher & Cernohorsky, 1985:91, figs. 4-5.

Type Locality: 80-85 m, Reunion Id, Mascarene Ids. Indian Ocean (21°06'S, 55°01'E).

Type Material: Holotype & 6 paratypes in MNHN, 1 paratype LACM 2835.

Remarks: Reassigned to the genus *Hastulopsis* by Terryn (2007).

purdyae, *Terebra* Bratcher & Burch, 1970b: 5, figs. 5-6.

Type Locality: 128-146 m, north of Isla Santa María (= Charles Id.), Islas Gal pagos (0°59'S, 90°25'W).

Type Material: Holotype LACM 1182, 1 paratype LACM 1183, 1 paratype CAS 13221.

Remarks: Treated as a junior synonym of *Terebra shyana* Bratcher & Burch, 1970, fide Bratcher & Cernohorsky, 1987.

quoygaimardi, *Terebra* Cernohorsky & Bratcher, 1976:135-137, figs. 14-15.

Type Locality: Marianas and Caroline Ids.

Type Material: Holotype and 1 paratype (of *T. monile* Quoy & Gaimard, 1833) MNHN.

Remarks: New name for *Terebra monile* Quoy & Gaimard, 1833 preoccupied [not *Buccinum monile* Linnaeus, 1771 (= *Terebra*)].

rancheria, *Terebra* Bratcher, 1988a:413, figs. 6, 8.

Type Locality: 3.5 m, Isla Ranchería Golfo de Chiriquí, Chiriquí Province, Panamá (7°38'N, 81°44'W) (Figure 3)

Type Material: Holotype LACM 2261, 3 paratypes LACM 2827, 1 paratype AMNH 222586, 1 paratype ANSP, 1 paratype BM 1986259, 1 paratype CAS, 1 paratype MORG 24.808, 1 paratype SDNHM 29522, 1 paratype USNM 859147, 8 paratypes in collection of C. Skoglund (Phoenix, Arizona) (pers. comm., 2007), 4 paratypes SBMNH 35459 (ex R. Koch collection [Phoenix, Arizona]).

reunionensis, *Terebra* Bratcher & Cernohorsky, 1985:93, fig. 3.

Type Locality: 170-225 m, Reunion Id., Mascarene Ids., Indian Ocean (21°05'S, 55°12'E).

Type Material: Holotype and 1 paratype in MNHN, 1 paratype LACM 2836.

Remarks: Reassigned to the genus *Clathroterebra* by Terryn (2007).

riosi, *Terebra* Bratcher & Cernohorsky, 1985:93, fig. 1.

Type Locality: Intertidal, Buzios, Cabo Frio, Rio de Janeiro State, Brazil.

Type Material: Holotype LACM 1974 [missing], 1 paratype LACM 2837, 3 paratypes MORG 21.278.

Remarks: Reassigned to the genus *Euterebra* by Terryn (2007).

shyana, *Terebra* Bratcher & Burch, 1970a:295-296, pl. 44, figs. 9-10.

Type Locality: 31-73 m, Manzanillo, Colima, México (19°02'N, 104°21'W).

Type Material: Holotype LACM 1249, 2 paratypes LACM 2813, 2 paratypes CAS 13280, 1 paratype ex SU 9992 [now in CAS Collection], 1 paratype USNM 679481.

stohleri, *Terebra* Bratcher & Burch, 1970b:5-6, figs. 7-8.

Type Locality: 18-37 m, Bahía Braithwaite, Isla Socorro, Islas Revillagigedo, México (18°42.3'N, 110°56.27'W).

Type Material: Holotype LACM 1180, 1 paratype LACM 1181.

swobodai, *Terebra* Bratcher, 1981a:330-331, figs. 5-6.

Type Locality: Attached to specimen of *Xenophora pallidula* Reeve, 1842, dredged from deep water off Zamboanga, Zamboanga del Sur Province, Mindanao Id., Philippines.

Type Material: Holotype LACM 1185, 1 paratype LACM 2825, 1 paratype BM 19018, 1 paratype USNM 773510, 1 paratype in collection of W.O. Cernohorsky (New Zealand), 1 paratype in collection of E. Swoboda (Beverly Hills, California) [current whereabouts unknown].

troendlei, *Terebra* Bratcher, 1981a:330, figs. 3-4.

Type Locality: 10 m, entrance to Hana Hevane Bay, Tahuata Id., Marquesas Ids., French Polynesia.

Type Material: Holotype MNHN, 4 paratypes MNHN, 1 paratype AMS C122397, 1 paratype AMNH 181848, 1 paratype BM 198023, 1 paratype CAS 60676, 1 paratype MORG 21.175, 1 paratype USNM 773511, 6 paratypes

LACM 1365, 1 paratype in collection of W.O. Cernohorsky (New Zealand), 1 paratype in collection of J. Tröndle (Tahiti) [current whereabouts unknown], 1 paratype in collection of B. Mabry [current whereabouts unknown].

Remarks: Reassigned to the genus *Acus* by Terryn (2007).

turschi, *Terebra* Bratcher, 1981a:331, figs. 7-8.

Type Locality: 36 m, Hansa Bay, Madang Province, Papua New Guinea (4°06'S, 144°22'E).

Type Material: Holotype LACM 1191, 4 paratypes LACM 2826, 1 paratype AMS 120657, 1 paratype AMNH 181847, 1 paratype ANSP 352483, 1 paratype BM 198020, 1 paratype CAS 60675, 1 paratype MORG 21.277, 1 paratype SDNHM 73614, 1 paratype USNM 773512, 2 paratypes in collection of W.O. Cernohorsky (New Zealand), 1 paratype in collection of B. Mabry [current whereabouts unknown], 4 paratypes in collection of B. Tursch (Brussels, Belgium) [current whereabouts unknown].

Molluscan Species named after Twila L. Bratcher

In recognition of her malacological achievements, the late Crawford N. Cate, James H. McLean and the late Roy Poorman, Walter O. Cernohorsky, and Philippe Bouchet honored Twila by naming new species after her. Species are listed alphabetically regardless of genus.

bracheriae, *Cymbovula* Cate, 1973:81-82, fig. 180 [Ovulidae].

Type Locality: Pulmo Reef, Golfo de California, Baja California Sur, México (23°12'N, 109°32'W).

Type Material: Holotype LACM 1610.

bracheriae, *Splendrillia* McLean & Poorman, 1971:99, fig. 27 [Turridae]. (Figure 1).

Type Locality: 36.6 m, south of Isla Tiburon, Golfo de California, Baja California, México (28°43'45"N, 112°17'50"W).

Type Material: Holotype LACM 1502, 1 paratype LACM 1503, 1 paratype CAS, 1 paratype USNM.

bracheriae, *Terebra* Cernohorsky, 1987:117-119, figs. 27-30 [Terebridae].

Type Locality: 183-192 m, northwest of Rottneest Id., Western Australia, Australia (31°44'S, 115°03'E).

Type Material: Holotype AMS C-149460, 4 paratypes AMS, 1 paratype WAM 365-86.

Remarks: Relegated to dubious status and excluded from the Terebridae by Terryn (2007) without an explanation or alternate familial assignment.

twilae, *Terebra* Bouchet, 1983:197, figs. 8, 35 [Terebridae].

Type Locality: 17 m, Ghana (5°45'N, 0°57'E).

Type Material: Holotype UZMC.



Figure 1. *Splendrillia bracheriae* McLean & Poorman, 1971 Holotype, 11.2 mm. Photo: Leroy Poorman.

Molluscan Publications of Twila L. Bratcher

Twila authored or co-authored 73 papers on various malacological topics in professional journals and popular literature. Her co-authors included the late Robert D. Burch, Walter O. Cernohorsky, the late Helen DuShane, Henk. K. Mienis and her sister Billee Dilworth. Twila's crowning achievement was the 1987 *Living Terebras of the World: A Monograph of the Recent Terebridae of the World* co-authored with Walter O. Cernohorsky, which is still the foremost terebrid reference available. A new publication by Yves Terryn (2007), *Terebridae: A Collectors Guide*, is an excellent companion volume and is graciously dedicated to Twila and Walter and their pioneering work with the terebrids.

* Denotes publications that include descriptions of new species.

BRATCHER, TWILA

1965. A search for *Cypraea isabellamexicana*. Hawaiian Shell News 13(9):7, figs 1-2 [July].
1967. A treasure hunt. Hawaiian Shell News 15(9):1, 3, 3 unnumbered figs. [September].
- 1969a. Rediscovery of *Terebra trochlea* Deshayes. The Veliger 11(4):334-335, pl. 52 [April 1].
- 1969b. Underwater symphony. Dive, pp. 58-59, text figs. [April].
- 1969c. Shell collecting in the Caroline Islands. Hawaiian Shell News 17(6):5 [June].
- 1970a. Range extensions of Indo-Pacific *Terebra*. Hawaiian Shell News 18(3):6, 2 unnumbered figs. [March].
- 1970b. Notes on Terebridae of the eastern Pacific. The Festivus 1(11):1-2 [November].
- 1971a. Conchological housing shortage or all about a pushy hermit crab. Hawaiian Shell News 19(1): 9, 2 unnumbered figs. [January].
- 1971b. Terebridae of the eastern Pacific [abstract]. The Echo, Western Society of Malacologists 3: 17 [March 7].
- 1971c. Silver lining. The Festivus 2(10):6-7 [October].
1972. Problems of an expedition. Tabulata 5(1):5-7 [January 1].
1972. The Ameripagos Expedition of 1971. Hawaiian Shell News 20(2):4, 6, 4 unnumbered figs. [February].
- 1972a. The shell game: Cowries. Skin Diver, July, pp. 44-45, figs.
- 1972b. The shell game: Cones. Skin Diver, pp. 46-47, figs. [September].
- 1973a. Tonga expedition. The Festivus 4(2):8-10, 4 unnumbered figs. [February].
- 1973b. Six *Terebra* look-alikes. Hawaiian Shell News 21(4):1, 3, 5 unnumbered figs. [April].
- 1973c. The shell game: Murex. Skin Diver, pp. 44-45, figs. [January].
- 1973d. The shell game: The sensual shell in an x-rated shell story. Skin Diver, pp. 48-49, figs. [March].
- 1973e. The shell game: Conch shells. Skin Diver, pp. 58-59, figs. [May].
- 1974a. Unexpected habitat for *Cypraea cinerea*. Hawaiian Shell News 22(1):3, 1 unnumbered fig. [January].
- 1974b. The shell game: The egg cowry. Skin Diver, pp. 44-45, figs. [March].
- 1974c. Collecting in Cuba. The Festivus 5(4):105-108, 7 unnumbered figs. [April].
- 1974d. In other words. Hawaiian Shell News 22(10):10 [October].
- 1975a. Collecting on Gaugin's Island. Hawaiian Shell News 23(5):1, 4, 2 unnumbered figs. [May].
- 1975b. Museum musings. The Festivus 6(10):65 [October].
- 1976a. Shell shows--the judge's views. Hawaiian Shell News 24(1):3 [January].
- 1976b. Danger in the deep. Young World, pp. 12-15. [April].
- 1976c. Trauma in the tank. Skin Diver, p. 80, figs. [May].
- 1976d. Those crazy mixed-up cowries. The Festivus 7(9):54 [September].
- 1977a. Deshayes' terebrid types in École des Mines, Paris. The Nautilus 91(2): 39-42, figs. 1-12 [April 25].
- 1977b. Ovoviparous volutes. The Festivus 8(5):30-31, 4 unnumbered figs. [May].
- 1977c. Born with their shells on. Hawaiian Shell News 25(6):1, 4, 2 unnumbered figs. [June].
- 1977d. Spotlight on West Africa. Hawaiian Shell News 25(7):1, 4, 1 unnumbered fig. [July].
- 1977e. Ovoviparous volutes. Sea Frontiers 23(6):374-376, 3 unnumbered figs. [November-December].
- 1977f. The genus *Cymbium* of Senegal, West Africa [abstract]. Western Society of Malacologists Annual Report 10:7 [December 14].
1978. Don't you believe it. The Festivus 10(9):67 [September].
- *1979a. Taxonomic changes in eastern Pacific Terebridae, with the description of a new species (Mollusca: Gastropoda). The Veliger 22(1):61-64, figs. 1-12 [July 1].
- *1979b. A new Indo-Pacific terebrid. The Veliger 22(1):65-66, fig. 1 [July 1].
- 1979c. A new *Terebra* honors E.R. Cross. Hawaiian Shell News 27(10): 16, 2 unnumbered figs. [October].
- 1979d. The feel of the sea. Westways 71(10):18.
- *1981a. Four previously undescribed Indo-Pacific terebrids (Mollusca: Gastropoda). The Veliger 23(4):329-332, figs. 1-8 [April 1].
- 1981b. Am-Mela Expedition to the Solomon Islands

- [abstract]. Western Society of Malacologists Annual Report 13:10 [June 29].
- 1982a. *Liguus* collecting. The Festivus 14(4):44-45 [April].
- 1982b. *Sherbornia mirabilis* Iredale, 1917. *Busyson* 17(12):5-6, figs.
- *1983. *Terebra knudseni* sp.n. from North Borneo (Mollusca, Gastropoda, Terebridae). *Steenstrupia* 8(15):301-305, fig. 1 [February 1].
- 1984a. Recently described *Terebra* and *Duplicaria* from the Philippines. *Carfel Philippine Shell News* 6(3):3-6, 9 figs.
- 1984b. *Thyca*. The Festivus 16(9):93, fig. 1 [September 1].
1985. The mystery of the dredge. The Festivus 17(5):50-51 [May 9].
- 1986a. Terebridae in Hawaii [abstract]. Western Society of Malacologists Annual Report 18:8 [January 31].
- 1986b. Range extensions of five terebrid species. The Festivus 18(9):127-129, figs. 1-6 [September 1].
- 1987a. Remote, barren Rowley Shoals has its charm. *Hawaiian Shell News* 35(1):1, 9-10, 3 unnumbered figs. [January].
- 1987b. *Thyca crystallina* follow-up. The Festivus 19(5):40-41, figs 1-3 [May 14].
- 1987c. *Thyca*, underarm and underfoot. *Sea Frontiers* 33(4):286-287, 2 unnumbered figs. [July-August].
- *1988a. Six new species of Terebridae (Mollusca: Gastropoda) from Panama and the Indo-West Pacific. The Veliger 30(4):412-416, figs. 1-10 [April 1].
- 1988b. Cuttlefish capers. *Ocean Realm*, Summer, p. 59, fig'd.
- 1988c. Spectacular *Spondylus*. *Hawaiian Shell News* 36(7):12, 2 unnumbered figs. [July].
- 1991a. *Conus dispar* at Isla Ceralbo? The Festivus 23(2):17, fig. 1 [February 14].
- 1991b. *Terebra argosia* alive and well in Panama. The Festivus 23(8):61-62, figs. 1-3. [August 8].
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Acknowledgments

Many thanks to Walter O. Cernohorsky (New Zealand), Brian Parkinson (Waipu, New Zealand), Max Marrow (Kew, Victoria, Australia), and Carol Skoglund (Phoenix, Arizona) for information regarding paratypes designated to their respective collections by Twila Bratcher.

Special thanks to Yves Terryn (Belgium) for the complimentary copy of his new terebrid identification manual *Terebridae: A Collectors Guide*.

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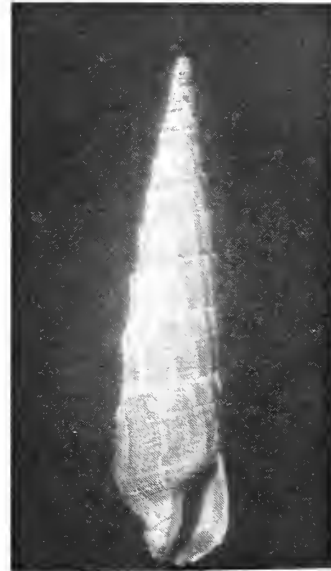


Figure 2. *Terebra carolae* Bratcher, 1979. Paratype. Photo: Courtesy of Carol Skoglund.



Figure 3. *Terebra rancheria* Bratcher, 1988. Paratype. Photo: Courtesy of Carol Skoglund.

WORKING WITH AND KNOWING TWILA BRATCHER

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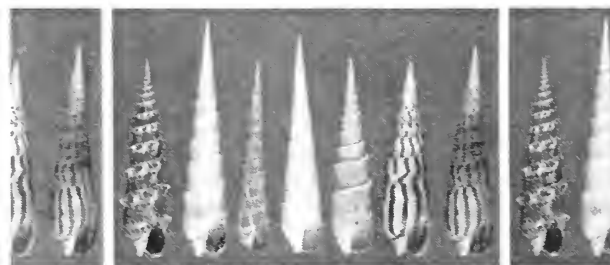
It was during a shelling expedition to the Fiji Islands with Twila, her sister Billee and 20 other shells collectors, that Twila and I decided to pool our studies on species of the family Terebridae. This resulted in co-authored papers on terebrids in 1969, 1982 and 1985, and culminated in 1987 in our published monograph *Living Terebras of the World* (Figure 1).

For this purpose we both examined independently as many type specimens of the family as were available to us and later compared our notes. Although many preparations for our monograph were conducted by correspondence, I did make several trips to the U.S. where I stayed with the Bratchers and spent countless hours with Twila working on our project in the basement room of her house.

We discussed, measured and counted ribs and whorls of every variety of species available to us prior to making a final decision that a species was indeed a valid biospecies. There were, of course, about 5% of instances where we could not agree on a species' boundaries of variation, and depending on the strength of one's argument of pro or con, it went either Twila's or my way in what fashion the species was to be dealt with. It was, of course, understood that in cases of a dubious decision as to a species valid biological status (usually due to a lack of any or suitable material), we expected several taxonomic changes in the future.

The 1987 publication of our *Living Terebras of the World* was Twila's culmination of her year-long studies of the family. In appreciation of her dedication to malacology, and in particular the family Terebridae, I described the same year (1987) a new species of *Terebra* in her honour as *Terebra bratcheri* from N.W. of Rottnest Island, West Australia in 183-192 m, collected by H.M.A.S. *Diamantina* in 1972 [see 1987, Cernohorsky, *Records of the Auckland Institute and*

LIVING TEREBRAS OF THE WORLD



A MONOGRAPH OF THE RECENT TEREBRIDAE
OF THE WORLD

Twila Bratcher & Walter O. Cernohorsky

edited by R. Tucker Abbott

Figure 1. The cover of the Terebra book.

Museum 24: 117, figs. 27-30].

Twila Bratcher-Critchlow was a kind and generous lady dedicated to her hobby, who led a full, productive and interesting life. It was a privilege to have met her and having been able to co-author with her the terebrid monograph to which she was justly proud, and I remain deeply indebted to her. Even with her passing, her name will remain entrenched in malacological literature.

TWILA BRATCHER-CRITCHLOW

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I was very privileged to have a friend and mentor as wonderful, fun, kind, brilliant and talented as Twila.

In 1986, Amos Nachoum asked me to lead a dive trip for his company *La Mer* to the Rowley Shoals in Western Australia. Very few boats had ever been there so I was armed with files full of his special instructions. I met my group in Perth and there were two older women (my perception then) “dressed to the nines” in the lobby, who turned out to be Twila Bratcher and her wonderful sister, Billee. Normally divers are jeans and t-shirt types so I thought these ladies would have a tough time on this trip. Was I ever wrong! I learned later that they had arrived in Perth to work with the museum and place special shells in the museum collection.

The trip participants flew from Perth to Broome in the very north of Western Australia. Broome seemed straight out of the *Crocodile Dundee* movie with biker bars, beautiful red soil and turquoise water with tidal changes of 34 feet. We boarded a motor sailboat and headed for the Rowley Shoals. There was a 16 foot drop from the bow into the ocean to start every dive and the Langdon sisters (Twila and Billee) even climbed up the unstable rope ladders with their tanks on their backs after their dives. (I had mine hauled up with a rope.) They had brought their California cold-water gear and could stay in the water even longer than I. After the trip, Twila needed knee surgery and I convinced her that she needed to allow crews to help her more and stop climbing rope ladders with her tank. She didn't need to prove herself.

Twila and I became instant friends, even though I was much younger and in awe of her. I would call her around 10 p.m. and she would be searching through some deep-water dredgings from the Museum of Monaco or some other prestigious institution, finding holotypes and paratypes of new species of shells. I had belonged to the Chicago Shell Club since 1978 so we had many interests in common. She was such an inspiration.

I always admired how close Twila and Billee were as sisters. They went on several dive trips with me to my

favorite places in the Philippines and made them most memorable. They even modeled special wetsuits on one trip (Figure 1). I never see the shells of *Epitonium billeanum* on their walls of yellow tube corals or *Tubastraea* without thinking of them. Twila named that shell after Billee in 1965.



Figure 1. Twila and Billee modeling special wetsuits aboard a scuba diving yacht on a Philippine trip. Photo: Courtesy of Billee Gerrodette.

Twila was fun! I invited her to come to Chicago and give a program for my Chicago Shell Club. She did *Around the World in 80 Dives*. At the end of her show the members said it was great that we “young ones” could do that. I convinced Twila to tell here age which



Figure 2. Billee and Twila at 40 feet in Batangas Bay, Philippines in April 1992. Photo: Courtesy of Tom Critchlow.

was 78 at the time (Figure 2). We both loved horses and she bought an incredible acrylic horse sculpture on that trip.

I was a flight attendant with TWA for many years and often bid to fly into LAX or Burbank to see Twila. She would pick me up in her little red convertible with the TEREBRA license plate and whisk me off to her home. It was always a special treat. When Tom Critchlow came into her life, we were all very happy she had such a wonderful and caring husband. He took such good care of her and allowed her to lead a good life even after her horrible fall.

Even in her 90s, I could never visit Twila and Tom for one or two days. There was always something

exciting to do that required staying longer. On one visit she and Tom invited me to go on a special tour of the San Diego Wild Animal Park in the back of a truck with the director, complete with a special dinner on the savannah. We got to pet baby rhinos and giraffes. Twila had the happiest smile feeding the giraffes.



Figure 3. Twila diving while on a trip with Lynn. Photo: Courtesy of Lynn Funkhouser.

Twila was the nicest person I ever met. She had only positive things to say about everyone. Even when I went to care for her in her final days, she was worried about "ruining your vacation." After not eating much for weeks, she told Tom she "would eat meat for him if she could be with him." They loved each other so much that it was delightful to be in their company. One evening she was taken to the emergency room at Scripps Memorial Hospital, so I talked my way into the emergency vehicle to be with her. The EMT asked her questions and pointed at me and asked who I was and Twila said, "That's my best friend."

To be Twila's best friend and to be able to care for her in her final days was one of the greatest honors in my life. She was way ahead of her time and a true original. She will always be missed.

TWILA CRITCHLOW—A REMARKABLE AND GENEROUS LIFE

LAWRANCE BAILEY

Senior Director of Development, Scripps Institution of Oceanography
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E-mail: lbailey@ucsd.edu

In 1953, Twila Critchlow became one of the first women in the U.S. to be certified as a SCUBA diver. She went on to travel the world and was one of the first to dive some of the world's most remote and now legendary locales. Twila was joined in many of her adventures by her younger sister Billee Gerrodette.

Twila began her adventurous life in a time when women were expected to stay at home. While still in her 20s, she made her debut as a rough-water swimmer in her home state of Idaho by braving 15 miles of the wild Clearwater River—equipped only with masks, fins, and determination. The young thrill-seeker had been inspired by the newly released movie *The African Queen*.

Twila's career has included being an award-winning journalist, a fashion model [see cover photo], and a widely published malacologist (seashell expert) (Figure 1). At one point, she learned braille in order to label hundreds of seashell specimens that she then gave to schools for the blind worldwide.

Critchlow was licensed to fly a plane in the 1930s. During the 1950s she often piloted her own plane to Baja California, then a little-known destination on the frontier of diving. During the same time period, she performed with a professional synchronized swim team known as the *Sea Nymphs*.

Following a severe stroke, Twila decided to create a charitable remainder annuity trust to benefit Scripps Institution of Oceanography. Twila's involvement with Scripps had been a long and interesting one. Prior to becoming a certified diver, she enjoyed a brief introduction to SCUBA under the supervision of diving pioneer Conrad Limbaugh, the first diving safety officer at Scripps. During the same era, she was often seen along the Scripps beachfront, gathering shells or participating in the popular midnight grunion runs.

Twila wanted to do something for her first love—the ocean. Specifically, she wanted to support research in the ecology of the ocean and the coral reefs, and to enable students interested in these areas to

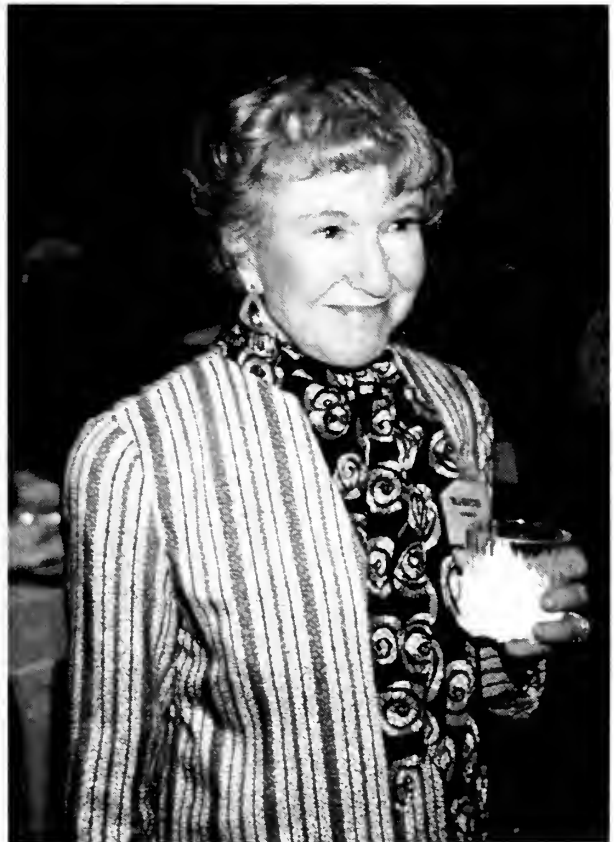


Figure 1. Twila at a meeting of the AMU/WSM meeting in Los Angeles in 1989. Photographer unknown. From the archives of the WSM housed at the Santa Barbara Museum of Natural History. Photo: Courtesy of Paul Valentich-Scott.

continue their educations. Starting in 2002, Twila began making annual gifts to Scripps, using the income from her trust. Her gifts have helped the SIO Collections weather a financial storm resulting from budget cuts by the State of California. Her support created the first endowment for the Collections.

The Festivus.
American Museum of Natural
History
Received on: 07-24-07



THE FESTIVUS

A publication of the San Diego Shell Club

ISSN 0738-9388

Volume: XXXIX

August 9, 2007

Number: 8

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c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111, USA.

The Festivus is published monthly except December.
The publication date appears on the masthead above.
Single copies of this issue: \$5.00 plus postage.

Meeting date: third Thursday, 7:30 PM.
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Philippine DIVERSity

Lynn Funkhouser, who has been diving and photographing since 1967 (and was inducted into the inaugural Women Divers Hall of Fame) will present a

program on diving in the Philippines. She has led trips there since 1978 and has dived 250+ Philippine islands in her 31 year career.

Meeting date: August 16, 2007

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CLUB NEWS

**Minutes of the San Diego Shell Club
July 19, 2007**

The meeting was called to order at 7:45 p.m. by President John LaGrange. Minutes of the last meeting were accepted as published in *The Festivus*. A sign-up sheet for the September Party potluck was passed around the membership.

The Festivus editor Carole Hertz announced a large sale of issues of *The Festivus* ranging from 1970 through 1996. She was praised by President LaGrange for the excellence of the recent issue of *The Festivus*, with its written and pictorial views of the life and times of Twila Bratcher-Critchlow.

Librarian Marilyn Goldammer announced the addition to the Club library of the revised guide *Sea of Cortez Marine Invertebrates* by Alex Kerstitch and Hans Bertsch.

Scripps Institution of Oceanography Professor of Marine Biology Research, Greg Rouse, was introduced as the evening's speaker. In addition to his professorial duties, Greg is the new Curator of the Benthic Invertebrate Collection at Scripps. His goal is to build a database, with online searching capacity, for the Benthic Collection; establish a DNA repository for the collection and provide an online guide to local La Jolla marine invertebrates. Further, he cordially invited club members to visit the collection.

The topic of his program was "Whalebone worms and the SIO Benthic Invertebrates Collection." His interest lies in the description, evolution and reproduction of marine worms. The subject of the evening's program was his deep-sea research that has taken place in the Monterey Canyon of northern California at depths ranging to nearly 4,000 meters. Using a Remote Operating Vehicle, Greg has studied an annelid-related worm, *Osedax*, growing into and devouring a whale skeleton. Fifty species of this group of worms have been recorded on "whalefalls" in this canyon. Their interesting anatomy and life styles were revealed in his photographs taken at the site. The *Osedax* oviduct is one third of the worm, and provides a home for great numbers of the tiny males. A sample of a bone, pitted with worm holes, was passed around

the audience, who provided many questions for Greg to answer on this exciting and puzzling group of animals.

Jules Hertz won the door prize, and then the meeting was adjourned at 8:50 p.m. for coffee and cookies. Refreshments were provided by Nancy Schneider, Carole Hertz and Wes Farmer.

Nancy Schneider

Addition to the Roster

DesChaine, Lewis, 3029 Silver Lake Rd., St. Anthony, MN 55418-2435. Phone: 612-789-4070.

A New Supplement of *The Festivus* Announced

Members/subscribers will find a blue slip enclosed with this issue which announces a supplement to 2007 to be published in September. The supplement is on Île Clipperton and is by Kirstie L. Kaiser.

If you are interested in receiving this supplement, which is free to those who are already paid members/subscribers, please respond to the blue slip promptly. This will enable us to better judge the number of issues to be printed.

**The Annual September Party
Saturday, September 22nd**

The September party will again be held at the home of Debbie and Larry Catarius. Festivities will begin at 4:00 p.m. (see map included with this issue). There will be a potluck sign-up sheet passed again at the August meeting.

Save the date, the party is always great fun!

The Club's Annual Christmas Dinner Party

The Club's annual Christmas Party will be held on the first Saturday in December (1st). By popular demand, it will again be held at the Butcher Shop in Kearny Mesa. Mark your calendars and plan to attend.

DISTRIBUTION OF *CONUS KOHNI* MCLEAN AND NYBAKKEN, 1979

JOHN K. TUCKER

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Abstract: Characters that differentiate three superficially similar species of cone shells (*Conus fergusonii*, *C. kohni* and *C. xanthicus*) are reviewed demonstrating that these three are specifically distinct. Previously the threatened *C. kohni* had been considered an endemic of the Galápagos Islands. Records based on specimens in museum collections are reported that extend the range to México suggesting that the species is more widespread than previously thought.

Introduction

Some years ago I was able to examine the collections of the Los Angeles County Museum of Natural History (LACM) (Tucker & McLean, 1992). At that time I examined specimens used in the description of *Conus kohni* McLean & Nybakken, 1979. I had little doubt that *C. kohni* was a distinct deep-water species of *Conus*. Since that time it seems that some uncertainty about this species has crept into the literature. Despite the species being one of the few cone shells listed on the IUCN red list of threatened species (IUCN, 2006), Filmer (2000) listed it as a form of *C. xanthicus*. Confusion about the identity of *C. kohni* will not aid in its conservation.

The uncertainty no doubt reflects the confused status of these species prior to the publication of McLean and Nybakken (1979). Nybakken (1970) following Hanna (1963) failed to separate *Conus fergusonii* G. B. Sowerby II, 1873, and *C. xanthicus* Dall, 1910, despite the differences in radular morphology that he observed (Figures A-C, herein). He attributed the two sorts of radulae to ontogenetic change. McLean (1971) also followed Hanna (1963) in listing *C. xanthicus* as a synonym of *C. fergusonii*. Walls (1979, p. 955) recognized that *C. xanthicus* and *C. fergusonii* were "...quite distinct and perhaps not actually related." The description of *C. kohni* appeared the same year that Walls' book was published. Unfortunately no subsequent comprehensive treatment of the Panamic cone shells has been published.

This uncertainty led me to borrow specimens of *Conus kohni* and *C. xanthicus* that I had previously examined at LACM in order to re-examine the problem. The purpose of the present paper is to clarify the identity

of *C. kohni* and review the characters that differentiate the species, all of which were first pointed out by McLean and Nybakken (1979). I also extend the range of the species to México.

Materials and Methods

The specimens examined are in the collections of the LACM. They included 9 (8 measurable) specimens of *Conus kohni* and 31 specimens of *C. xanthicus*. All specimens had shell length and width measured at the museum with calipers (method of Kohn and Riggs, 1975). Subsequently, a subset of these specimens was reexamined and photographed. I also examined 15 specimens of *C. fergusonii* and three of *C. xanthicus* from my personal collection (JKT) for comparisons. I used analysis of covariance (ANCOVA) to compare dimensions among species with the Bonferroni adjustment selected (SAS, 2000).

Results and Discussion

The small sample available did differ statistically in shell dimensions. *Conus fergusonii* has a relatively wide shell once differences in shell length are accounted for. Least squares mean for shell width in *C. fergusonii* was 29.9 mm compared to 20.1 mm for *C. kohni* and 21.9 mm for *C. xanthicus*. Comparison of the mean for *C. fergusonii* to the other two species was statistically significant ($t = -4.19$, $p = 0.0003$ for *C. kohni*; $t = -3.71$, $p = 0.0015$ for *C. xanthicus*). In contrast the means for *C. xanthicus* and *C. kohni* were not different ($t = 1.41$, $p = 0.4888$). The difference reflects the more swollen shoulders typical of *C. fergusonii* (Figure 4).

Although shell dimensions can be shown to differ

statistically, this is of little practical use. Other traits are much more important in properly identifying these species. These species do differ in details of the color pattern, in the spire morphology (Figures 2, 4, 5), in the nature of the operculum and periostracum, and in the morphology of the radula. I briefly outline these differences, all of which were previously listed by McLean and Nybakken (1979).

Juveniles of *Conus fergusonii* have vertical rows of small darker brown spots on top of the orange coloration (Figure 4). These spots are absent in *C. kohni* and *C. xanthicus* (Figures 1-3 and 5, 6, respectively). The spire whorls of *C. kohni* and *C. xanthicus* have color markings on them that are the same shade as the color markings on the body whorl (Figures 2 and 5, respectively). The spire whorls of *C. fergusonii* do not have blotches (Figure 4). Moreover, nodules are markedly well developed and reach at least whorl 9 in *C. fergusonii*. Nodules are barely developed on the spire whorls of *C. kohni* and disappear by whorl 3. They are not much better developed in *C. xanthicus* where they are gone by whorl 6. The spire morphology of *C. kohni* is unique in that the whorl tops are distinctly scalariform and concave in cross section. The earliest three or four whorls have these concave whorl tops set almost perpendicular to the coiling axis (Figure 2). In contrast, the earliest whorls of *C. xanthicus* and *C. fergusonii* form an acute angle with the coiling axis making them appear much less scalariform than in *C. kohni*.

Besides the conchological characters, these species have distinctive periostraca and opercula. *Conus xanthicus* has a small operculum that is about 2 times longer than it is wide. In contrast, the operculum of *C. kohni* is long and is at least 3 times longer than wide; *C. fergusonii* also has a long operculum that is four or more times as long as it is wide. The translucent periostracum of *C. xanthicus* is fringed at the shoulder, whereas the periostraca of *C. kohni* and *C. fergusonii* are not fringed.

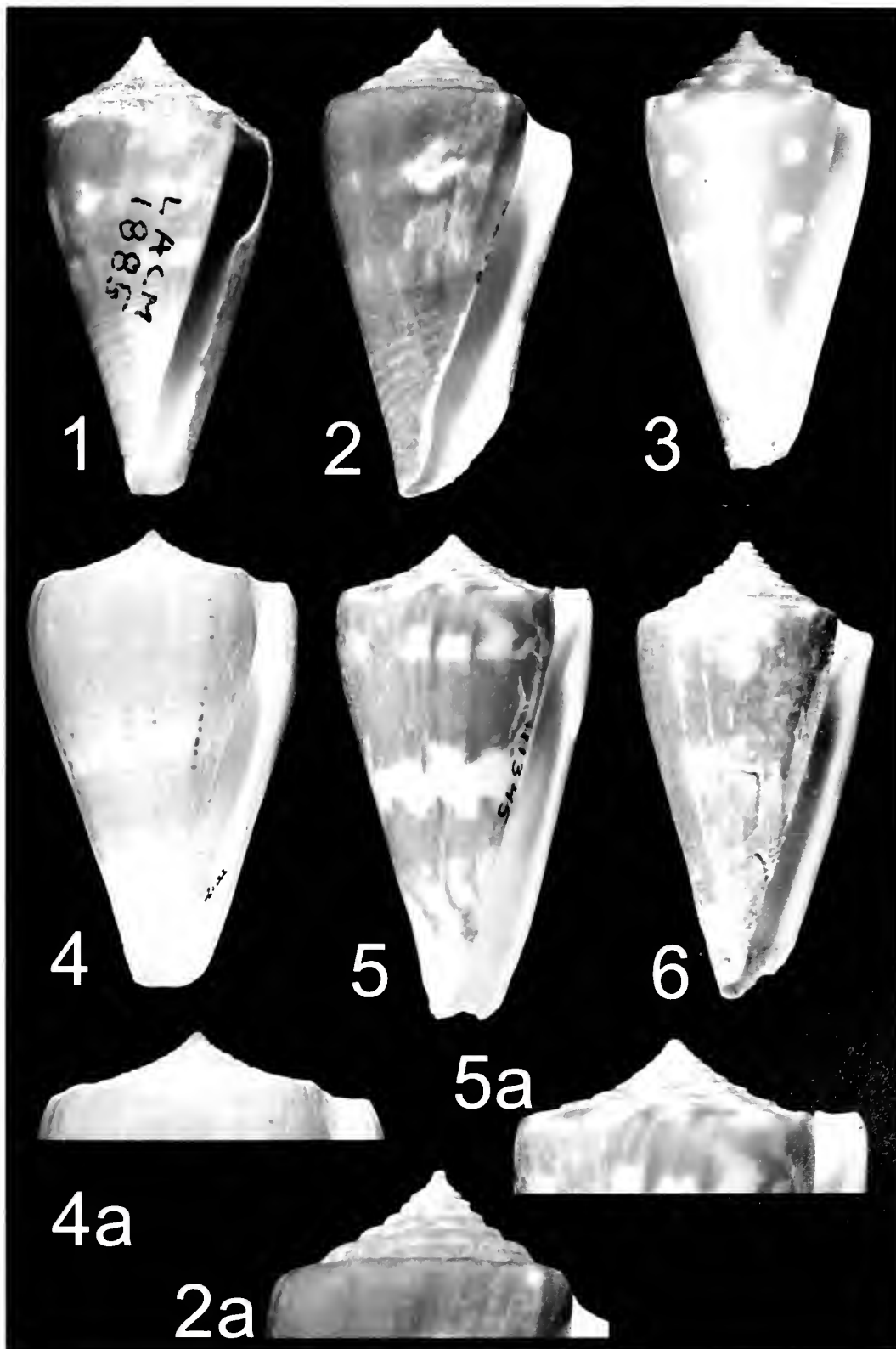
Finally the radular morphology establishes the distinctiveness of *Conus kohni* beyond doubt. The radular tooth of *C. kohni* has what Nybakken (1970) described as three barbs on the anterior tip of the tooth

(Figure F). The tooth does not have serrations. This sort of tooth is shared with *C. emarginatus* (Figures 1, 2, D) and *C. arcuatus* (Figures 3-5, E), in the east Pacific. The morphology is likely ancient and derived from an ancestor with the sort of radula that *C. emersoni* has (Tucker & McLean, 1992). The three-barbed radular type is also found in several Indo-Pacific species such as *C. comatosa* and *C. orbignyi* (Rolán & Raybaudi Massilia, 1994). To underscore the likely ancient origin of the radular type, consider that this sort of tooth also occurs in *C. coromandelicus* (Thiele, 1929), a species of *Conus* that is often incorrectly placed in the genus *Conorbis*.

In contrast, the teeth of *Conus xanthicus* (Figures B, C) and those of *C. fergusonii* (Figure A) have a number of advanced traits. Both species have the shaft of the tooth serrated. The serrations terminate in a large cusp that is located inside the tooth. Although often modified in various ways, this sort of tooth is found in many world-wide cone shells including many species from the east Pacific. Despite being generally similar, the teeth of *C. fergusonii* and *C. xanthicus* do differ. The blade in *C. fergusonii* is much shorter than it is in *C. xanthicus* (Figure A vs. Figures B and C). As is characteristic of many short bladed teeth, the tooth is more elongated in *C. fergusonii* than it is in *C. xanthicus* (compare scale bars in Figure A to those in Figures B and C).

In summary, it is unlikely that any species newly described (in 1979) could be so completely differentiated by its authors from species with similar shells. The similarity in color patterns is due to convergence and likely *Conus kohni* is not even congeneric with the other two species. The rarity of this species in collections may be a large part of the problem. It was previously known only from the Galápagos Islands and has been considered an endemic there (Kaiser, 1997). However, when I examined the LACM collections, I noted two specimens of *C. kohni* that had been misidentified as *C. xanthicus*. Both confirm the speculation that the species might occur elsewhere in the eastern Pacific (McLean & Nybakken, 1979). One of these Mexican specimens is shown in Figure 3 and the locality data are in the figure captions.

Figures 1-6. (1) LACM 1885 *Conus kohni*, 35.3 mm, holotype of *Conus kohni* McLean & Nybakken, 1979, from Caleta Tagus, in 18-37 m, Isla Isabela, Islas Galápagos, Ecuador, photograph courtesy H. Chaney, Santa Barbara Museum of Natural History. (2) LACM 788.38 *Conus kohni* 43.5 mm, 55 fm on coral and shell bottom, southeast of Daphne Major Island, Islas Galápagos, Ecuador 0°27'S, 90°21'50"W, Jan. 19, 1938. (3) LACM 35562 *Conus kohni* 29.2 mm, Isla Espiritu Santo, Golfo de California, México. Leg. Captain Fred Lewis (identified as *Conus xanthicus* on museum label). (4) JKT 2102 *Conus fergusonii*, 56.3 mm, 200 ft., shrimp boats, Bahía de Chiriquí, Panamá. (5) LACM 11345 *Conus xanthicus*, 53.3 mm, 73 m, off La Paz, Baja California Sur, México. Leg. Antonio Luna, Jan. 1974. Specimen was illustrated by McLean and Nybakken (1979: fig. 15). (6) LACM 35563 *Conus xanthicus*, 31.0 mm, Guaymas, Sonora, México. →



The other specimen, which is not shown, is LACM 34-173.2, a specimen of *Conus kohni* that is 23.9 mm long and that was collected at a depth of 64 m, in sand, off Bahía Sulphur, Isla Clarión, Islas Revillagigedo, México, 18°20.1'N, 114°43.8'W, Leg. R/V Velero III, 11 Jan. 1934. These two specimens seem to demonstrate that the species has a fairly wide range in México and likely the east Pacific.

Acknowledgments

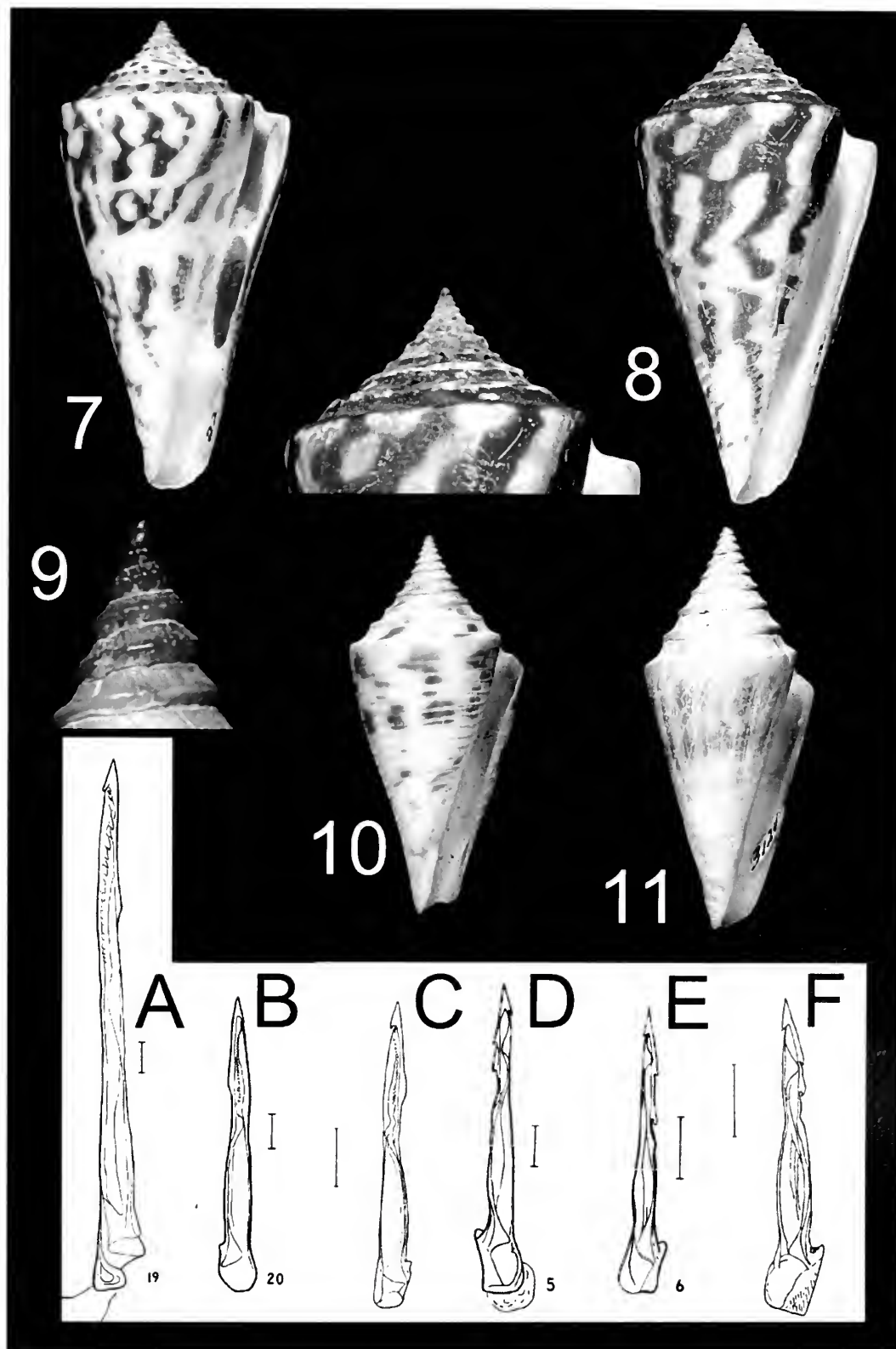
I thank James Nybakken and the American Museum of Natural History for permission to reproduce illustrations from American Museum Novitates. Geerat J. Vermeij and Henry W. Chaney gave me permission to reproduce the images from The Veliger. Lindsey Groves was instrumental in arranging loans for material in LACM. James McLean allowed me access to the LACM collections.

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Figures 7-12. (7) JKT 22, *Conus emarginatus*, 57.7 mm, trawled by shrimpers, Guaymas, Sonora, México. (8) JKT 22, *Conus emarginatus*, 51.1 mm, trawled by shrimpers, Guaymas, Sonora, México. (9) JKT 33, *Conus arcuatus*, 28.0 mm, Guaymas, Sonora, México. Trawled, 1972. (10) JKT 3124, *Conus arcuatus*, 41.6 mm, Guaymas, Sonora, México. (11) JKT 3124, *Conus arcuatus*, 38.3 mm, Guaymas, Sonora, México. (12) LACM 35563, *Conus xanthicus*, 31.0 mm, Guaymas, Sonora, México. Ex. Howard Hill.

Figures A-F. (A) Radular tooth from a juvenile *Conus fergusonii* from Nybakken (1970), used with permission. Scale bar is 0.1 mm long. (B) Radular tooth of a juvenile "*Conus fergusonii*" (= *Conus xanthicus*) from Nybakken (1970), used with permission. Scale bar is 0.1 mm long. (C). Radular tooth of *Conus xanthicus* from McLean and Nybakken (1979), used with permission. Scale bar is 0.1 mm long. (D) Radular tooth of *Conus emarginatus* from Nybakken (1970), used with permission. Scale bar is 0.1 mm long. (E) Radular tooth of *Conus arcuatus* from Nybakken (1970), used with permission. Scale bar is 0.1 mm long. (F) Radular tooth of *Conus kohni* from McLean and Nybakken (1979), used with permission. Scale bar is 0.1 mm long. →



BOOK NEWS

Sea of Cortez Marine Invertebrates, A Guide for the Pacific Coast, México to Perú, 2nd Edition (Revised)

By: Alex Kerstitch (posthumous) and Hans Bertsch.
2007.

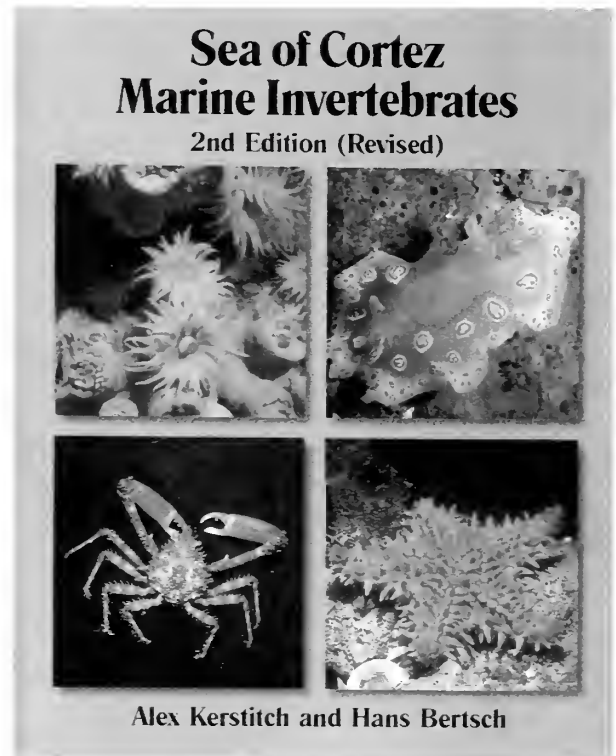
Published by: Sea Challengers, Monterey, California,
Price: \$24.95.

The second (revised) version of the classic *Sea of Cortez Marine Invertebrates* now by Alex Kerstitch (posthumous) and Hans Bertsch offers a glance into the diversity of shallow water common marine organisms found in this unique region. The book includes beautiful photographs and comprehensive descriptions with both scientific and common words. This combination along with the glossary makes species identification relatively easy for casual and more advanced readers.

Most species include the English common name and in some cases there are well-deserved Spanish epithets for animals such as the "almeja chiluda." The book would benefit from including author and publication dates for the species treated and species numbers on the photographs. For the most part the latter should not be necessary because species descriptions are placed next to the photographs, but in some instances, like in pages 28-29, it is not straightforward to determine which description corresponds to which photograph.

The scope of the book is very ambitious, including benthic as well as pelagic species and it should be made clear to the reader that this book is just a "scratch on the surface" of the diversity found in the Sea of Cortez, particularly when it comes to benthic species. A possible method to illustrate the diversity of the region would be to include a complete list of species reported from the Sea of Cortez at the end of the book. This list would give the more advanced readers a way to begin the search for species they cannot identify using this guide. It would also be nice to see a map with the different localities, biogeographic regions and geographic scope of the book.

I was pleased to see that the book is particularly strong on opisthobranch mollusks, which is not surprising considering the beauty of these organisms and the research interests of the junior author, but this may give the wrong impression to the casual reader that the diversity of this group is comparatively higher than it



actually is.

This book definitely constitutes a must have, especially for those of us who love this biologically diverse, extremely beautiful, and scientifically fascinating body of water that is now more than ever in need of all the attention we can possibly give it. Hopefully, this book will not be the last of the series and a more needed bilingual version will follow soon. Congratulations to the authors for this wonderful piece of work.

Ángel Valdés
Associate Curator of Malacology
Natural History Museum of Los Angeles County



THE FESTIVUS

A publication of the San Diego Shell Club

ISSN 0738-9388

Volume: XXXIX

September 13, 2007

Number: 9

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Emerita, Tulane University, New Orleans

THE ANNUAL SEPTEMBER PARTY

Because of the annual September Party at the
home of Debbie and Larry Catarius on Saturday
September 22nd, there will be no regular meeting this

month. Maps were sent with the August issue. Anyone
still needing a map, contact Carole Hertz (858-277-
6259). See details under Club News.

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CLUB NEWS

**Minutes of the San Diego Shell Club
August 16, 2007**

The meeting was called to order at 7:55 p.m. by President John LaGrange. Minutes of the last meeting were accepted as published in *The Festivus*. The September Party was again announced, and the sign-up sheet for potluck dishes passed around.

Carole Hertz announced that Ken Franke will be our speaker in October, during which he will recall an oceanic trip in a submersible vessel. Jules Hertz announced that the September supplement to *The Festivus*, devoted to a comprehensive report on Clipperton Island, will be sent, without additional cost, to those of the paid members who have requested a copy [see notice, last page].

Our evening's speaker, Lynn Funkhouser, was introduced by Carole Hertz. She has spent time diving in the Philippine Islands for the past thirty years. Lynn shares membership in The Women Divers Hall of Fame with esteemed San Diego Shell Club members Billee Gerrodette and her sister, Twila Bratcher-Critchlow (deceased). She has also prepared the photography for the Desk Diary for many years and was a consultant on the new Shedd Aquarium exhibit on the Philippines.

Of the 7,107 islands of the Philippines, Lynn has visited 250 of them. Her interesting slide show presentation was entitled "Philippine Potpourri" and included images from World Heritage Sites in the islands. Projected on the screen were scenes as diverse as precisely contoured rice terraces, referred to as the 8th Wonder of the World, to colorful coral reef inhabitants and swimming schools of jack and tuna. Lynn had a fondness for swimming with the enormous whale sharks and told us of the morning she counted 39 of them before lunch!

Following her illuminating presentation, Lynn responded to a member's question regarding conservation measures that have been put in place in the Philippine Islands. She discussed the tragedy of "blast fishing" and noted that local fishermen are learning to utilize bamboo nets in their quest for fish. She soberly noted that Australia's Great Barrier Reef is now expected to be gone by the year 2030.

Member Clint Crowe won the evening's door prize. The meeting was adjourned at 9 p.m. With coffee, refreshments were provided by John Bishop, Wes

Farmer, Marilyn Goldammer and the Gerrodettes.

There will be no regular meeting in September because of the up-coming traditional September Party.

Nancy Schneider

Change to the Roster

Dale Roberts – dale.roberts2@astrazenica.com

**The Annual September Party Saturday,
September 22nd**

The September party at the home of Debbie and Larry Catarius will begin at 4:00 p.m. on Saturday afternoon the 22nd. This is the third year that Debbie and Larry have offered their home for this gathering and each one has been a fun time. Members and guests arrive with their best potluck offerings (to serve 12) which make for a delicious dinner and the conversation and get-together with friends is special. A map to the Catarius' home was included with the August issue. Should you need a map, contact Carole and Jules Hertz at 858-277-6259 and one will be sent to you. Hope to see you there.

WSM Student Grants Awarded

Lindsey Groves of the WSM Student Grant Committee wrote in part, "On behalf of the WSM Student Grant Committee, we would like to thank you for the support that the San Diego Shell Club has bestowed upon the WSM and in particular to the student grant program throughout the years." The winners are listed below.

Brian Cheng (San Diego St. Univ.): Invasion of southern California sea grass habitat to the introduced Asian mussel (*Musculista senhousia*). \$700.00.

Meaghan Parker (Univ. Hawaii): Evolution and biogeography of the Pacific land snail family Achatinellidae. \$500.00

Stephanie Schroeder (Univ. Oregon): The behavioral ecology and territoriality of the Owl Limpet, *Lottia gigantea*. \$300.00

FILLING IN A GAP ON *RHIZOCHILUS ANTIPATHUM* STEENSTRUP, 1850 (GASTROPODA: CORALLIOPHILINAE)

CAROLE M. HERTZ¹

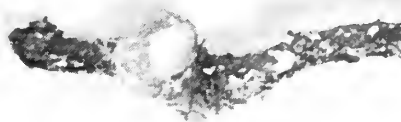
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On a recent visit to Puerto Vallarta, Jalisco, México, Kirstie Kaiser, Carol Skoglund and my husband Jules and I visited San Blas, Nayarit, for a short adventure from 15-17 February. We toured a lagoon observing more beautiful and unusual birds than I had ever seen; we strolled the beaches at low tide looking for mollusks and we visited the commercial shrimp trawlers at their dock inquiring if they had any caracoles (shells). One shrimper's gift made the whole

trip for me.

I listened as Kirstie chatted in Spanish with a shrimper and I heard the magic word "coral". The fisherman gave her a branch of the black coral, *Antipatharia* sp., and on it was an embedded cluster of the elusive *Rhizochilus antipathum*. The coral branch is ± 50 cm with three *Rhizochilus* specimens (1 adult and 2 juveniles) embedded near the base of the branch (Figures 1, 2). The fisherman told us that it had been taken between Guayabitos and San Blas, both in Nayarit. He said that the depth (in which they trawled the specimens) was 12 to 18 "brazas" (22-33 m) – a braza equaling 1.82 m. This depth is, of course, approximate.

A bit later, while still at the dock checking out the shrimp boats, we met Rogelio, another shrimper, and asked him if he had any caracoles. He said he did and that if we could wait he would go home and get them. He returned on his bike in less than a half hour with a small ± 15 cm piece of a lower branch of black coral, shaped rather like a slingshot (Figure 3). On one stem was a *Pteria sterna* (Figure 4) and on closer look at least 20 *Rhizochilus antipathum* were seen embedded in the coral. Rogelio said the piece had been taken near Isla Isabel (also between San Blas and Guayabitos).



Figures 1,2. (1) Branch of *Antipatharia* sp. with cluster of *Rhizochilus antipathum*. (2) Detail showing cluster of *R. antipathum* at base of branch in Figure 1. Photos: K.L. Kaiser.

¹ Mailing address: 3883 Mt. Blackburn Ave., San Diego, CA 92111, USA.

It wasn't until we returned to the hotel and looked at the coral under the loupe that we could see the still-unembedded 2.5 mm juvenile on the branch (Figure 5). The closeup dorsal views (Figures 6, 8) show its tilted protoconch, the first teleoconch whorl with its heavy, somewhat noded, flattened spiral cords with deep sutures, the cords varying from cream to rusty brown. The anterior siphon cannot be seen but the siphons of two neighboring embedded specimens are clearly visible. It was exciting to see this colorful juvenile specimen of *Rhizochilus antipathum* before it became enveloped by the *Antipatharia* sp. See Kaiser & Hertz (2001, fig. 10) for discussion of this species.

On the same piece, just below a small pink brittle star, were two juveniles (Figure 7) the larger ± 7 mm. Both are lightly covered by the *Antipatharia* sp. but still totally visible. When completely embedded, only the anterior siphons are visible.

The species *R. antipathum* was originally described from the Red Sea. These specimens from Nayarit add another location to the distribution of this deeper-water species which is seldom seen in the Panamic Province.

Poorman (1981) observed over 30 *Rhizochilus* specimens and reported the genus from the Golfo de California, México, but didn't figure any of them or positively identify them to species listing them as "sp.

aff. *R. antipathus*". Kaiser and Hertz (2001) gave a history of the species and reported it at Clipperton (French possession) and Isla del Coco, Costa Rica, and Schneider (2006) wrote of the species from off Hurricane Bank, 600 miles off mainland México in 128 m.

The rest of our stay at San Blas was anticlimactic after this find. We were happy to return to Puerto Vallarta where we greatly enjoyed the rest of our vacation at Kirstie's beautiful home.

My thanks to Kelvin Barwick for the splendid photographs of the juvenile specimens of *Rhizochilus antipathum* and to Kirstie Kaiser for the photographs of her specimens and for hosting us for this vacation.

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2006. Collecting *Rhizochilus antipathum* by hook & line. *The Festivus* 38(3): 27-31, figs. 1-10.

Figures 3-8.

Figure 3. Partial branch of *Antipatharia* sp. ± 15 cm. from a commercial shrimp trawler at San Blas, Nayarit, México.

Figure 4. *Pteria sterna* (Gould, 1851) on the branch of *Antipatharia* sp. shown in Figure 3.

Figure 5. A 2.5 mm juvenile specimen of *Rhizochilus antipathum* Steenstrup, 1850, in situ on the same branch of the *Antipatharia* sp.

Figure 6. Closeup view of *R. antipathum* shown in Figure 5. Note the siphons of two additional embedded specimens.

Figure 7. Pink brittle star and two specimens of *R. antipathum* partially covered by the *Antipatharia* sp. shown in Figure 3.

Figure 8. *Rhizochilus antipathum* shown in Figure 6 enlarged to show the sculpture on the tilted spire.





FISHING FOR A GIANT MOLLUSK *DOSIDICUS GIGAS* (ORBIGNY, 1835)

WESLEY M. FARMER

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It is January 2007 and the Humboldt Squid are in town again and the fishermen are aboard the party boats jigging for a hook-up. The other day 22 anglers caught 135 *Dosidicus gigas* (Figure 1) from one party boat. There is preparation and anticipation by the fishermen because they are going squid fishing. Besides a heavy lead sinker one needs a squid jig. No fish hook is needed. These dudes hook themselves on the ring of straight stainless needle-sharp steel snags, with the sharp points turning upward, the points surrounding an elongated oval plastic that glows a kind of green. That color attracts the fish to the lure. A tentacle or two grips the lure and snags itself and the tug to escape is not accomplished by the squid.

When the party boat arrives at the fishing grounds it is dark, since it heads out at dusk. The lures are charged by the bright deck lights if the lures' luminescent green is built into the plastic. Otherwise a small ampoule of glass surrounded by plastic is broken to mix two chemicals that make the green glow. They are placed in a larger plastic tube near the sharp points of the lure.

Fishermen are ready to lower the lures to the bottom at a depth of approximately 250 feet. A Humboldt Squid can then be caught. After a time the squid will follow the green glow to the surface as the fishermen reel in their lures. Some squid are then caught at the surface.

When the squid reach the surface, caught by the lure, they squirt water from their siphons on their underside at the leading edge of their mantle. The powerful squirt of water might reach out beyond the length of the squid. The deck hand will gaff the squid (gaff is an iron hook with a handle for landing large fish/squid) and bring it onto the deck. Then the squid might do what squid and octopus do, that is to provide a squirt of black "ink". If one is not careful it might get onto another fisherman and, of course, the deck of the boat. When there are 22 fishermen on-board and, say, ten have each caught a squid, there is a lot



Figure 1. *Dosidicus gigas* (Orbigny, 1835) caught off 9 Mile Bank.

of action with fishermen shouting for gaff, gaff, gaff. Not just one fisherman but ten might be in line for gaff, gaff. These squid might weigh 20, 30, 50 pounds and be 4, 5, or 6 feet in length.

When alive the squid's chromatophores change color rapidly from their usual terra cotta color to nearly white. One can look closely at the dorsal skin and see individual chromatophores becoming small dots or expanding into large points of color.

Should a malacologist like to add one of these carnivores to his/her molluscan collection, this is a good way to do it. Study their large eyes, or discover their pen or examine their beak and all the suckers on their arms and tentacles. Did you know that each of these suckers has a ring of golden-colored chitinous spikes and as the suckers apply suction, the spikes can dig into its prey?

When the fishing trip is over around midnight, the party boat heads back to the dock. On the way back, the

deck hands clean the fishermen's catches. Basically that is done by saving the squid's mantle without its tail fin. The dorsal side of the mantle is a terra cotta color and the ventral side is white. The terra cotta-colored skin is stripped from the mantle and discarded. The white skin is stripped from the mantle and then white meat is cut into smaller portions and placed in plastic bags for the fishermen. When I asked a crewman how many squid had been caught since the season's fishing trips began, the answer was "thousands."

The meat can be frozen for a future date of

cooking. As for me, I learned to make finger-sized pieces, dip them in egg batter or a fish batter product and cook them in olive oil. The thickness of the mantle is around an inch and cutting it so it is a half inch in thickness before cooking works for me. These pieces of meat do not have to be pounded like abalone, they are already tender. Cook for a couple of minutes and enjoy the bite-sized molluscan morsels known as calamari.

Wouldn't you all want to add a giant squid to your molluscan collection?

A New Supplement to *The Festivus* Announced

The Festivus is proud to announce the publication of a new supplement by Kirstie L. Kaiser entitled *The Recent Molluscan Fauna of Île Clipperton (Tropical Eastern Pacific)*. This iii+162 page book with color cover and map, 41 black and white plates, 2 color plates and 21 text figures, many in color, is now available for purchase.

This report gives a malacological history of Clipperton, an annotated compilation of the Recent molluscan fauna of the island with background information on the four expeditions to Clipperton in which the author participated and a documented zoo-

geographic review of the molluscan fauna. An annotated checklist of rejected species previously recorded is also included as well as an index to taxa.

The Supplement is available at \$40 postpaid domestic, \$45 (Canada and México) airmail postpaid and \$50 overseas airmail postpaid.

Send orders to The San Diego Shell Club at 3883 Mt. Blackburn Ave., San Diego, CA 92111, USA. Orders will be filled promptly on receipt of payment. Payment for overseas orders should be sent by check on a U.S. bank. We regret that we cannot accept credit cards or money orders.

The Festivus.
American Museum of Natural
History
Received on: 09-24-07



THE FESTIVUS

A publication of the San Diego Shell Club

ISSN 0738-9388

Volume: XXXIX

October 11, 2007

Number: 10

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Membership (includes family). Domestic \$20.00;
Overseas (air mail):\$30.00; Mexico/Canada (air mail):\$20.00.

Address all correspondence to the San Diego Shell Club, Inc.,
c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111, USA.

The Festivus is published monthly except December.
The publication date appears on the masthead above.
Single copies of this issue: \$5.00 plus postage.

Meeting date: third Thursday, 7:30 PM,
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WHAT YOU SEE OUT OF THE WINDOW OF A MILLION-DOLLAR SUBMARINE

Ken Franke, head of the Harbor Police, will be our speaker. On his boat "Outer Limit" which carries a submarine, he has been doing marine research from

Alaska and south all along the coast on abalone and fish. His talk will be based on images taken of the bottom from the submarine and focusing on abalone.

Meeting date: October 18, 2007

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CLUB NEWS

**The Annual September Party Saturday,
September 22nd**

The weather was certainly "iffy" for the get-together, but host Larry Catarius said "We're all Californians and the weather doesn't bother us." So the party was going to be on, no matter what! And of course the weather cleared for the occasion.

This is the third year that Debbie and Larry have offered their home for this gathering and each one has been a fun time. Twenty members and guests arrived with their best potluck offerings – the food is always outstanding at Club parties – and the conversation and get-together with friends was special. Attendees were everywhere, it seemed. Some in the garage oohing and aahing over some of Larry's finds, some in the garden admiring the beautiful plantings that Debbie and Larry have done, and most of us gabbing away – and snacking with wine etc. – on the lovely back patio.

It was a very lovely party and we thank Debbie and Larry once again for hosting us.

Change of address

Waters, Charles, P.O. Box 189010 #227, Coronado, CA 92178. Cell phone: 760-415-4031.

The Club's Annual Christmas Dinner Party

The Club's annual Christmas Party will be held on the first Saturday in December (1st). By popular demand, it will again be held at the Butcher Shop in Kearny Mesa.

Festivities will begin at 6:00 p.m. with no host cocktails and dinner at 7:00 p.m. As usual there will be a traditional gift exchange and special program for the evening.

Mark your calendars and plan to attend.

2007 Supplement to *The Festivus*

The Recent Molluscan Fauna of Île Clipperton (Tropical Eastern Pacific) by Kirstie L. Kaiser is now available for sale.

This iii + 162 page book with 41 b&w plates, 2 color plates, 21 text figures (some in color) plus color cover and map is \$40 postpaid domestic, \$45 postpaid Canada and Mexico and \$50 overseas airmail postpaid.

To order contact Carole Hertz, at phone: 858-277-6259 or e-mail: jhertz@san.rr.com or write to: The San Diego Shell Club, Inc. at 3883 Mt. Blackburn Ave, San Diego, California 92111, USA.

MARY McPEAK**1939 – 2007**

It is with sadness that we report the passing of Mary McPeak. She and her husband Ron were longtime, active members of the Club. Mary had suffered for many years from the effects of rheumatoid arthritis and she succumbed on 17 September 2007. She is survived by her husband Ron and children Susan and Kenneth and grandchildren.

REPORT AND PERSPECTIVES ON THE FORTIETH ANNUAL MEETING, WESTERN SOCIETY OF MALACOLOGISTS

HANS BERTSCH

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Under the Presidency of Dr. Carlos Cáceres Martínez, the 40th Annual Meeting of the Western Society of Malacologists (WSM) was held 25-29 July 2007 at the conference facilities (Centro de Convenciones) of the Universidad Autónoma de Baja California Sur, La Paz (Figures 1-7). Opening festivities and lodging were at Hotel La Perla, a historical presence on the beachfront malecón since 1941. Six papers were presented at the Historical Malacological Session (Moderator Arqueóloga Harumi Fujita), seven at the Malacology and Ecology Session (Moderator Dr. Estéban Félix Pico), 16 at the General Session (Moderator Dr. Hans Bertsch), and 10 at the Mollusc Aquaculture and Fisheries Session (Moderator Dr. C. Cáceres Martínez). Saturday afternoon there were 24 posters presented (Moderators Dr. Douglas Eernisse and Dr. Cesar Ruiz Verdugo). The traditional Banquet (Cena de Clausura) was held in authentic Mexican splendor, at sunset on the beach, at El Caimancito. Sunday's field trip boated us to Isla Espíritu Santo, where we were taken to the first pearl oyster farm in the La Paz area, a 16,000 B.C.E. pre-Pericú habitation site, geology run amok, and a swim with lurking alpha-male and goofy juvenile sea lions.

This was the second meeting of the international WSM in México (see Annual Report, WSM, 2007, Vol. 37, for the edited and expanded abstracts of that meeting held in Ensenada), and also marked the first time that brothers have served as Presidents. This is fitting. The WSM is family. It has a unique goal and strong tradition contrapuntal to other mollusk study groups (documented in its revolutionary founding ethos). Since 1968, membership in the WSM has been predicated upon a broad inclusiveness, mutual support, and shared intellectual ventures, evidenced by the annual Student Grant, jointly sponsored by the Society, the San Diego Shell Club and individual donors.

All papers were presented in English, even by the few (definitely in a minority) native English speakers who attended. It was an incredible array of scientific endeavors, predominantly emphasizing studies in the Sea of Cortez. This meeting was held where the research was happening! Myra Keen and John Steinbeck would have been proud of the multi-themed contributions to our understanding of molluscan biology and sustainable human usages in their beloved waters.

In this report, I can only comment on some of the papers that "tickled my fancy" and emphasize the diversity of research that appealed to each conference attendee.

David K. Mulliner (1921-2007), the 1st and 25th WSM President, was honored by three "In Memoriam" presentations: Chris Kitting's close-up imaging of Mollusca, Doug Eernisse and Anthony Draeger's "Chitons Collected by the Mulliners in the Northern Gulf of California," and some personal thoughts and nudibranch videos by Mike Miller (assisted by Rosa Campay).

Several papers were presented on the temporal and geographic distribution of paralytic shellfish poisoning along the Mexican Pacific coastlines, including a clam's muscle view, "Are toxic dinoflagellates harmful to bivalves?" (which my wife Rosa, Judy Terry Smith, Doug, Chris and I dutifully ignored when we stopped at a "Mariscos" street-corner stand and devoured the "Coctel Campechano," mixed seafood cocktail!). Later, José Manuel Green Olachea's poster "Mexican Gastronomy and Bivalves" described commercial methods assuring safe human consumption of this resource.

The Historical Malacology Session featured reports on Oligocene, Paleocene, Eocene and Pleistocene mollusks, from the glaciers of Alaska to the desert-bound formations of Baja California Sur.

Biblical Tyrian purple mollusk-derived dye has its Mexican counterpart in Oaxacan dresses purpled by the ink of *Plicopurpura pansa*. We heard studies on the effects of over-collecting this resource, aquaculture techniques to gather the dye sustainably, and the changing molecular shapes of the muricid exudant's benzene-ring compound structures. J. Murillo Álvarez, Ludwig Naegel and Cormac Murphy explained that the hypobranchial gland of *P. pansa* secretes brominated compounds that have a photo-oxidase property. The color of the secretion is changed by light. These investigators isolated the three phases (clear, greenish, then purple), with the lights off or on at crucial times, and then determined the structure of each. Basically (and probably over-simplistically), a single double-ring became joined with a similar one (along with a number of side chains), in transitioning from clear to purple. Wow! Functional morphology at the molecular level.

I had the humbling personal honor of introducing Dr. Ricardo Perez Enriquez's (and colleagues) talk on gene flow of *Strombus gigas* in the Mexican Caribbean. He had been an undergraduate student in my "Zoología de los Invertebrados" course at Universidad Autónoma de Baja California, Ciencias Marinas, Ensenada, in the early '80s, and now he is a Ph.D. studying the molecular genetics of molluscan populations.

Research in the newly-designated Biosphere Reserve of Bahía de los Ángeles included works on the biology of the Lion's paw scallop *Nodipecten subnodosus*, opisthobranch feeding biodiversity and seasonality and the trophic ecology of *Octopus bimaculatus*.

Oral and poster student presentations were so exceptional that it was decided to award three prizes for

each. Thanks to generous contributions by US members in attendance, the winners were awarded an expense-paid Society field trip on Sunday. Those who had prior commitments received autographed copies of the newest, 2nd edition of *Sea of Cortez Marine Invertebrates*. As judged by Doug Eernisse, Chuck Powell and Chris Kitting, the best student paper presentations were given by José Alberto Miranda Velasco, "Species identification of canned 'abalone' using forensically informative nucleotide sequencing"; Sheila Castellanos Martínez, "Parasites of the renal sacs from *Octopus hubbsorum* Berry, 1953, in Bahía de La Paz, B.C.S., México"; and Lillian Bloch, "Species differentiation in the venerid bivalve genus *Transemella*." Fittingly, Ms. Bloch was reporting on the research she accomplished as a recent recipient of a WSM Student Grant!

The best student posters were presented by Diana Zaleta Pinet, "Embryonic development description of *Pteria sterna* (Bivalvia: Pteriidae) until trocophore apparition"; Noe Diaz Viloria, "Microsatellites as genetic markers for pink abalone *Haliotis corrugata*"; and Jorge Ivan Cáceres Puig, "Stereological study of the rainbowlip pearl oyster *Pteria sterna* at a commercial farm during a year."

As for the Banquet – it was sunset on the beach, bathing suits *de rigueur*, wafting evening breezes from the Gulf, and five courses of invertebrate and piscine delights. Carlos Cáceres and his wife Daniela Barrios Ruiz graciously hosted the "Evening by the Bay," while reminiscences of mollusks seen, plans for future viewings, and student accolades were heartily shared.

We met dockside Sunday morning for the field

Figures 1-7. 40th Annual Meeting, Western Society of Malacologists, Group Photo: (1) (back row, l-r) Hans Bertsch, Mario Alberto González Suarez, Josafat Jehú Ojeda, Brian Urbano, Lillian Bloch, José Alberto Miranda, Ricardo Pérez Enriquez, Noe Díaz Viloria, Ricardo Gluyas Millán, Dwight Arrieche, Arturo Tripp Quezada, Douglas Eernisse, Charles Powell, Nora Foster, Christopher Kitting (middle row, l-r) Mirna Bravo, Fernando Abasalo Pacheco, María Eliana Gómez Robles, Jorge Ivan Cáceres, Georgina Gluyas Millán, Esteban Félix Pico, Rosa del Carmen Campay, Sheila Castellanos, Norma Estrada, Judith Terry Smith, Ivan Murillo (front row, l-r) Yadira Trejo, Eréndira Gorrostieta, Wendy Storms, Carlos Cáceres Martínez, Daniela Barrios Ruiz and baby Juliana Cáceres Barrios, Diana Zaleta (2) Mike Miller and Chris Kitting (3) Harumi Fujita, Carlos Cáceres and Daniela Barrios Ruiz (4) Carlos Cáceres and Esteban Félix Pico (5) On the beach for the banquet (6) Opening Ceremony, Miguel Ojeda de la Peña, Rodrigo Serrano, Hans Bertsch, Carlos Cáceres Martínez (7) At the first pearl oyster farm.

Photo credits: 1, Carlos Cáceres; 2, 3, 4 and 6, Mike Miller; 5 and 7, Hans Bertsch. →



excursion. Three super-charged outboard pangas from the Universidad, each covered with a goddess-sent shade-giving tarp, took us from the malecón, past the hotels, yacht clubs and Pinchilingue ferry landing, and out distantly to the protected open seas, where we skirted, and then landed on, the west coast of Isla Espíritu Santo. Geological malapropisms abounded in a helter-skelter fashion, to which Judy Terry Smith kept telling us, "Well, the rocks are complicated!" The Island was heat and sun, while we scrambled over lava boulders. The delicate green sea was mellow in contrast with the deeper-green-leaved mangrove forest carpeted with red, white and black frigate birds wing-flapping and beak-squawking. The heat was so intense that not

even rattlesnakes dared hide in the shade—they were "adios." We saw the remains of the 100 year old pearl oyster farm, heard the tale of a murdered pet deer (told to us blindfolded listeners in bilingual stereo by Carlos Cáceres and Rosa Campay), and picnicked on the beach next to a major archaeological site. At Los Islotes we swam with the sea lions, sergeant majors and sea gulls: memorable.

Next year's meeting will be at Menlo Park, in the Bay Area, 5-8 June 2008. Maybe all the talks will be in Spanish. I congratulate Dr. Carlos Cáceres, his team at UABCS, and all the participants for an exceptionally scientific, engaging and productive 40th Meeting of the WSM. Kudos to all.

TWO UP-COMING MEETINGS IN SOUTHERN CALIFORNIA

Southern California Unified Malacologists XII: Scum Returns to L.A.!

The twelfth annual meeting of the *Southern California Unified Malacologists* (SCUM) will convene in the Education Department classroom (2nd floor) of the Natural History Museum of Los Angeles County [900 Exposition Blvd., Los Angeles, California 90007] on January 19, 2008 from 8:00 a.m. – 3:30 p.m. The doors will open at 8:00 a.m. for breakfast-type fare and the meeting will begin around 9:00 a.m.

For detailed presentations (limited to 15 minutes) a projector with PC laptop will be available for those participants with PowerPoint presentations. For others, a 35 mm Carousel projector and/or overhead projector will be available. It would also be very helpful to know ahead of time who will be presenting detailed talks.

Please RSVP as soon as possible so we know how many pastries to purchase, how much coffee to brew, and who will be presenting detailed talks. For more information and/or reservations, contact Lindsey Groves e-mail: lgroves@nhm.org, phone: 213-763-3376.

Next meeting of the Southern California Association of Marine Invertebrate Taxonomists (SCAMIT)

SAFIT and SCAMIT will conduct a hydrobiid gastropod taxonomic workshop on November 1-2, 2007. Weston Solutions, Inc. will host the workshop at its Carlsbad, CA office.

The guest speaker is Dr. Robert Hershler of the Smithsonian Institution. The topic is gastropods in the family Hydrobiidae of the western United States.

This workshop is free but is limited to 35 participants. Registration is first come, first serve and open to anyone interested in attending. Please contact me to reserve your space. Registration is open until all spots have been filled or until the deadline of October 26th. If you register but cannot attend please contact me so that your space can be given to someone else.

For reservations and/or questions, contact Sheila Holt, Project Leader/Benthic Laboratory Manager, Weston Solutions, Inc., 2433 Impala Dr., Carlsbad, CA 92010. E-mail: Sheila.Holt@westonsolutions.com or phone at 760-795-6914.

CONUS LUCIDUS IN THE SOLOMON ISLANDSJOHN K. TUCKER¹, FRANCISCO SICILIA-GUILLÉN², AND MANUEL J. TENORIO³

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Introductions of exotic gastropods and their subsequent colonization of new habitats have become a problem worldwide. For instance, 104 exotic species have been introduced along the Channel and Atlantic coasts of France (DuPont et al., 2006). Fortunately only a few of these are classified as invasive species, a term defined as species with significant side effects (DuPont et al., 2006). The problem is not restricted to the Atlantic Ocean. Some species such as the veined whelk (*Rapana venosa* (Valenciennes, 1846) have colonized both sides of the Atlantic (Savini & Occhipinti-Ambrogi, 2006; Harding & Mann, 2005).

Here we report the collection of a specimen of the lucid cone shell (*Conus lucidus* Wood, 1828) from the Solomon Islands. This species is a resident of the tropical Eastern Pacific ranging from Bahía Magdalena, Golfo de California, México to Ecuador including the Islas Galápagos (Keen, 1971). The Solomons' record is the first for the species from the western Pacific and some 11,600 km west of the Islas Galápagos.

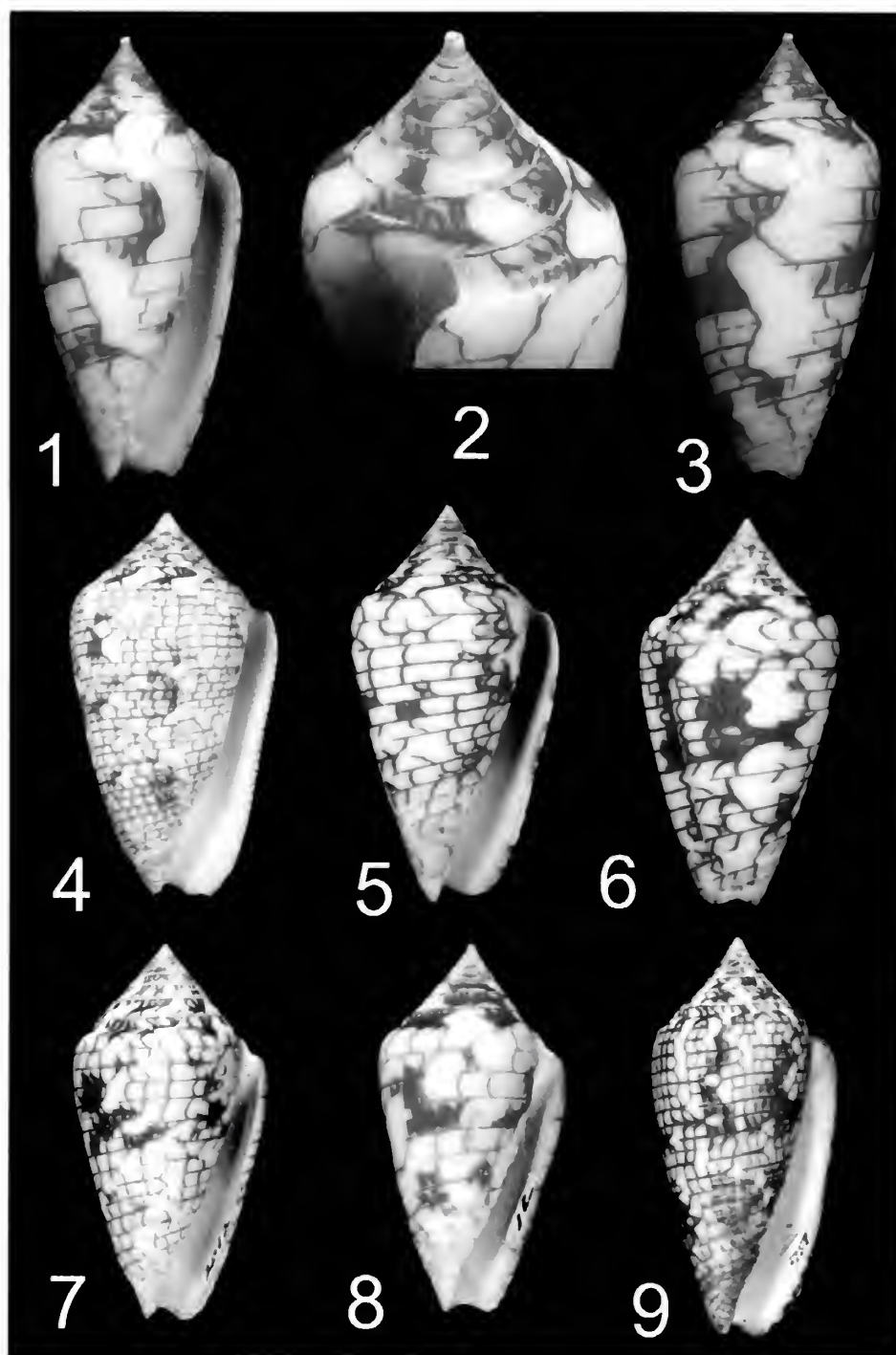
One specimen was collected alive by Sicilia-Guillén in November 2004. It measures 22.6 mm in length. It was collected by snorkeling at 2-4 m water depth, under a dead coral slab, close to shore at the beach in front of the Kitano Mendana Hotel, Honiara, Solomon Islands.

At present there is no evidence that the specimen represents a previously unrecognized population of the species in the Solomons. Rather we think it is likely a

waif accidentally released at Honiara by one of the many vessels calling at this harbor. We do not know if other individuals are present at the site. However, other specimens should be reported if they are found.

This instance may represent a previously unrecognized means of dispersal for exotic species, namely transport by shell collectors. Generally introductions of exotic gastropods arise from discharge of ballast (Savini & Occhipinti-Ambrogi, 2006; Carlton, 1996) or from activities of the commercial shellfish industry (DuPont et al., 2006). However, we think that *C. lucidus* was carried to the Solomons possibly from the Galápagos (compare Figures 1-3 to 5, 6, 8) by a private vessel. Honiara and the Mendana Hotel are frequent destinations for shell collectors visiting the Solomons. Nonetheless, this is an unusual situation because most introductions are of western Pacific species brought to the eastern Pacific or Atlantic Oceans (Carlton, 1999).

This species is not likely to become an ecological problem even if it does become established in the Solomons. *Conus lucidus* is a specialized predator on polychaetes (Nybakken, 1978) and not a more generalist predator such as *Rapana venosa*. It also does not prey on shellfish and is likely of no economic consequence. However, such introductions are to be discouraged because their ecological consequences are never predictable (Carlton, 1996). Unwanted specimens should



Figures 1-9. *Conus lucidus*. (1-3). 22.6 mm, snorkeling at 2-4 m under dead coral slab, collected November 2004 by Francisco Sicilia-Guillén close to shore, at beach off Kitano Mendana Hotel, Honiara, Solomon Islands, (Google earth coordinates: 9°25'46" S; 159°57'15" E), Francisco Sicilia-Guillén Collection (4) 55.3 mm, 61 m in sand, Cabo San Lucas, Golfo de California, México, August 1972, collected by Alex Kerstitch. This specimen was illustrated in Walls (1979 p. 424, bottom right), Manuel J. Tenorio Collection (5-6) 32.3 mm, 20 m, in sand, Islas Galápagos, Ecuador, June 1980, Manuel J. Tenorio Collection (7) 33.8 mm, Golfo de Panamá, Panamá, John K. Tucker Collection, JKT 2012 (8) 22.6 mm, west coast of Isla Santa Cruz, Islas Galápagos, on sand at low tide, John K. Tucker Collection, JKT 16 (9) 47.5 mm., Golfo de Panamá, Panamá, John K. Tucker Collection, JKT 1759.

be discarded properly.

Acknowledgments

Kevin Cummings, Illinois Natural History Survey, assisted in making images of specimens from JKT collection. We thank Henry Chaney for details on *Conus lucidus* and travel patterns between the Solomons and eastern Pacific.

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The Festivus.

American Museum of Natural
History

Received on: 10-19-07



THE FESTIVUS

A publication of the San Diego Shell Club

ISSN 0738-9388

Volume: XXXIX

November 8, 2007

Number: 11

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Membership (includes family). Domestic \$20.00;
Overseas (air mail):\$30.00; Mexico/Canada (air mail):\$20.00.

Address all correspondence to the San Diego Shell Club, Inc.,
c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111, USA.

The *Festivus* is published monthly except December.
The publication date appears on the masthead above.
Single copies of this issue: \$5.00 plus postage.

Meeting date: third Thursday, 7:30 PM,
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PROGRAM

TAKING A LOOK AT SCISSURELLIDS

Daniel Geiger, of the Santa Barbara Museum of Natural History, has been working on these micromollusks for the past seven years. He will give an overview of these stunning, tiny

marvels using photographs and scanning electron microscope images. The evolution of size from abalone to Scissurellidae will also be explored.

GIANT REPRINT AND BOOK SALE

Meeting date: November 15, 2007

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CLUB NEWS

San Diego Shell Club Meeting – October 18th 2007

The meeting was called together by President John LaGrange at 7:40 p.m. The minutes of the previous meeting were accepted as published in *The Festivus*. Jules Hertz reminded everyone of the upcoming Christmas Party to be held on December 1st, at 6 p.m. at the Butcher Shop on Kearny Mesa. The cost will be \$30 per person, with a guarantee of 25 persons. [See Col. 2 for details.]

Carole Hertz presented an amendment to Club bylaws, with the recommendation that the terms of office of Treasurer and Recording Secretary be extended from 5 to 10 years. The amendment was seconded and passed unanimously, both by e-mail vote and voice vote at the meeting.

The slate of officers for 2008 was presented and includes: President - Jules Hertz, Vice-President - open, Treasurer - Silvana Vollero, Corresponding Secretary - Marilyn Goldammer, Recording Secretary - Paul Tuskes. The voting for 2008 board will take place at the November meeting.

Hans Bertsch announced the publication of the latest edition of *Sea of Cortez Invertebrates*. They were available for purchase at the meeting.

John LaGrange proposed that the Club conduct a survey of the current mollusks living in Mission Bay. Appropriate times of extreme low tides will be chosen, along with beach access to all ages, so that the survey may become a Club project. Ultimately a summary of data obtained will then be compared to the data collected on Mission Bay as early as the 1950s. Several people offered to volunteer in this effort.

Marilyn Goldammer, Librarian, presented a new listing of library contents which may be accessed online.

Carole Hertz introduced the speaker of the evening, Ken Franke, who has a passion for marine biology perhaps as a result of growing up in San Diego in the Pt. Loma Lighthouse. For 25 years he has run a charter boat, *Outer Limits*. Currently he oversees Police Boats in San Diego Harbor. Four years ago, Ken, working through NOAA, joined with the local scientific community for the purpose of observing local sustainable fisheries of rockfish, white abalone, and sea urchins. By utilizing his boat equipped with an ROV, operated by Dr. Butler and Dr. Deemer, more territory could be covered than by using traditional divers.

Images received have been successful in providing definitive data needed to maintain local fisheries. For instance, at the Tanner Bank, the cow cod rockfish were as numerous as to appear as a cloud of fish, when it had been thought that they were gone. A video presentation of this operation served to verify his revealing findings. This pilot project has proved so successful, it is going to be used by the investigators along the entire coastline. The goal of sustaining fisheries will be affected by moving open fishing areas from place to place, as a result of this valuable data.

The meeting was adjourned at 8:45 p.m. The door prize was won by Jim Goldammer. Baked treats at the coffee table were furnished by John Bishop and Marilyn Goldammer.

Nancy Schneider

**The Club's Annual Christmas Dinner Party
Saturday, December 1st**

The Club's annual Christmas Dinner Party will be held on Saturday, December 1st in the Board Room at the Butcher Shop at 5255 Kearny Villa Road in San Diego (858-565-2272) off Highway 163 at Clairemont Mesa Blvd. Festivities begin at 6 p.m. with no host cocktails. Dinner will be served promptly at 7 p.m.

The menu is as follows:

Classic Caesar Salad with dinner rolls and butter
Choice of two entrees (a vegetarian meal also available)

Filet of Salmon or Prime Rib of Beef. Both entrees with garlic mashed potatoes and fresh vegetables.

Dessert New York Style Cheesecake,

Beverage Coffee or Tea

Dinner Wine will be provided by the Club.

Following dinner there will be a special program by noted underwater photographer and author, Eric Hanauer.

To end the evening there will be the traditional gift exchange. Bring an anonymous gift-wrapped shell (or shell-related gift) with only a very general locality on the outside i.e: Atlantic, South Pacific etc. to place under the tree. This is a fun part of the evening – don't fail to participate.

The cost for the entire evening is \$30 per person. Because the party is held early in December, it is necessary to have your reservations (check) by Monday, November 26th. You can even bring your check for reservation to the November meeting!

GROWTH SERIES FOR *MALEA RINGENS* (SWAINSON, 1822)
AND *SEMICASSUS CENTIQUADRATA* (VALENCIENNES, 1832)
(GASTROPODA: MOLLUSCA)

CAROL SKOGLUND¹

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Have you ever found a tiny shell where no amount of research seemed to help in finding a name for it? This has happened to me several times over the years, and frequently it turns out that the small shell I wanted to identify was the very young of a larger species that changes dramatically as it grows.

Malea ringens (Swainson, 1822) is just such a shell. The adult (Figure 1) is a heavy, white shell with strong

spiral ribs and large teeth on the outer lip of a distinctive aperture. These features make it easy to identify. It can be as large as 270 mm (Hutsell et al, 1997). The literature I was familiar with at the time said it had no operculum.

In 1977 my husband Paul and I dredged a tiny (4.5 mm) round, smooth brown shell with an operculum (Figure 2) that I could not identify. It took several years and much more dredging of intervening-sized *M. ringens* before I realized that my very small shell could actually be seen on intermediate-sized shells of *Malea*

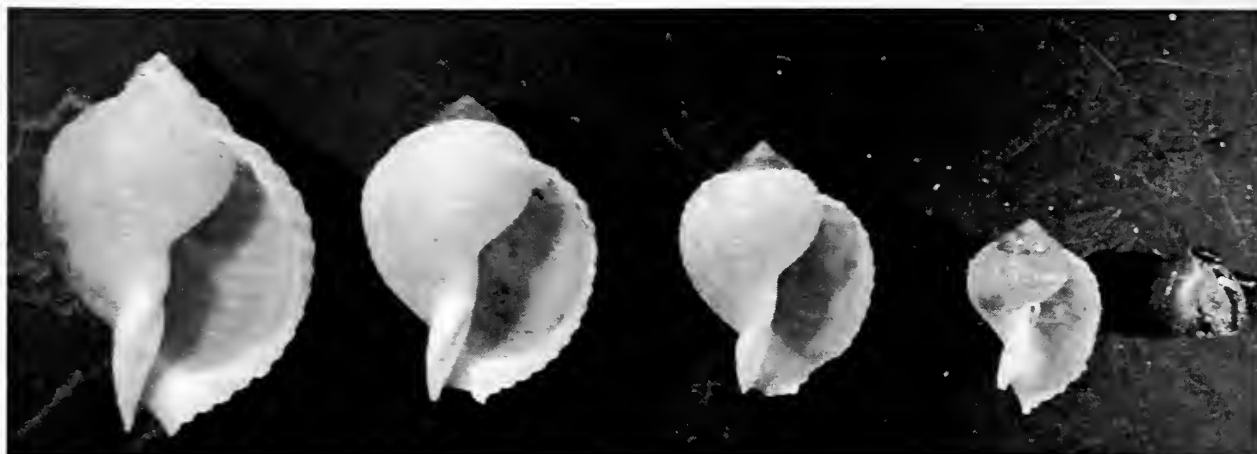


Figure 1. *Malea ringens*. H. 186 mm, Bahía Chamela, Jalisco, México. Found in fish camp trash pilings, leg. C. & J. Hertz, Feb. 2002, Hertz Collection. Photo: S. Parlett.



Figure 2. H. 4.9 mm, with operculum. Caleta de Los Angeles, Bahía Tenacatita, Jalisco, México, dredged by Paul & Carol Skoglund in 6 to 20 m, mud bottom, 1977, Skoglund Collection. Photo: K. Barwick.

¹Mailing address: 3846 E. Highland Ave., Phoenix, AZ 85018, USA.



Figures 3a-e. Growth series of *Malea ringens*. left to right: (3a) H. 17.4 mm (3b) H. 14.3 mm (3c) H. 11.4 mm (3d) H. 8.5 mm., Playas Del Coco, Guanacaste, Province, Costa Rica. Dredged by Paul & Carol Skoglund in 24 to 37 m, mud bottom, Dec. 1977. (3e) H. 4.9 mm, Caleta de Los Angeles, Bahía Tenacatita, Jalisco, México. Dredged by Paul & Carol Skoglund, 6 to 20 m, mud bottom, 1977, Skoglund Collection. Photo: K. Barwick.

ringens as part of the nuclear whorl and was that species (Figure 3).

Further search of the literature turned up some interesting and contradictory information. Kay (1979: 231) said *M. ringens* had no operculum. Powell (1979: 161) stated "They [*Malea*] have a thick tubular proboscis and an broad foot, but no operculum." Wilson, (1993: 251) stated about the family Tonnidae, "There are no varices, axial sculpture or operculum."

The earliest reference I found was Turner (1948:165) who said, "In the Tonnidae, so far as is now known, all species have an operculum in their young stage, but only in *Oocorys* does it persist in the adult." She illustrated a young *Tonna maculosa* with its operculum (Figure 4 herein).

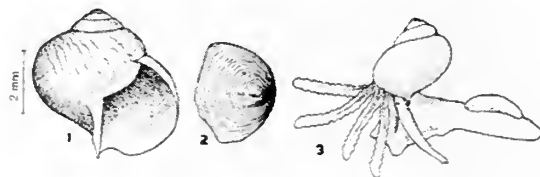


Figure 4. After Turner, 1948. pl.74, figs. 1-3. "Fig. 1-2. Shell and operculum of pelagic young of *Tonna maculosa*? Dillwyn, from the Campeche Bank, Yucatan Fig 3. The pelagic young of some species of *Tonna*. showing the long velar lobes, the foot and the operculum (Fig. 3, after Fischer)."

She also wrote on p. 166, "Very little is known of the life history of the various species of the Tonnidae other than the fact that the sexes are separate and that they produce free-swimming, pelagic young. The

embryonic shell of *Tonna* has 3 to 4 whorls, is smooth and has a golden-brown coloration. It consists mainly of periostracum overlaying a thin layer of lime. The aperture is closed with a well-developed, tightly-fitting operculum. In adults the early whorls become much thickened by a lime deposit." Abbott (1974: 167) said of the genus *Tonna*, "The operculum is lost in the adult stage." From these references you can understand the confusion concerning the occurrence of an operculum in *Malea ringens*.

Semicassis centriquadrata (Valenciennes, 1822) is another shell easy to recognize in the adult stage (Figure 5). Changes during growth (Figure 6) are less drastic

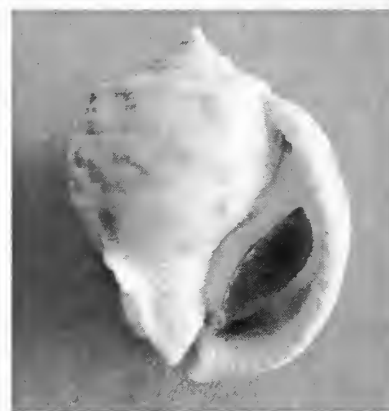


Figure 5. *Semicassis centriquadrata*. H. 65.2 mm, Playa Radar, ± 20 miles south of San Felipe, Baja California, México, intertidal, sand, -6 ft. tide, leg. C. M. & J. Hertz, May 1968, Hertz Collection. Photo: S. Parlett.



Figure 6. *Semicassis centiquadrata*. Growth series from 3 to 16.5 mm. Caleta de Los Angeles, Bahía Tenacatita, Jalisco, México, dredged by Paul & Carol Skoglund in 6 to 20 m, mud bottom, between 1975 to 1977, Skoglund Collection. Photo: K. Barwick.

than those of *Malea ringens* but still interesting. The 3 mm shell (Figure 7) shown in the series is just beginning to show the ribs on the dorsal side that are prominent in the adult shell. It could easily be mistaken for another species.



Figure 7. *C. centiquadrata*, H. 3 mm., at right end of series in Figure 6. Photo: K. Barwick.

To my knowledge, there has been no confusion about the operculum in *Semicassis*, which is present in all growth stages. However, the genus status and name have been changed by several authors in the past (Skoglund, 2002). The largest reported shell is 89.9 mm (Draper, 1987).

My thanks to Kelvin Barwick and Suzanne Parlett for the photography and to Carole Hertz for help in locating references.

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CONCHOLOGISTS OF AMERICA CONVENTION 2007

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The Conchologists of America Convention 2007 titled "Chardonnay and Shells" was held in Portland, Oregon on August 1st through 5th. This was my first time attending such an event and I really did not know what to expect. Registration began on July 29th with several field trips scheduled for attendees until the official opening of the Convention. The trips included, fossil hunting, visiting the Columbia River Gorge, Mt. Hood and Mt. St. Helens as well as a winery tour with wine tasting. A comprehensive Schedule of Events can be obtained from the Conchologists of America website.

The special guest speaker was molecular biologist Dr. Baldomero Olivera, named "Harvard Foundations 2007 Scientist of the Year" for his research with neurotoxins produced by venomous cone shells found in the tropical waters of the Philippines. On August 2nd Dr. Olivera presented a lecture on "Learning Neuroparmacology from Cone Shells". Unfortunately, I was not able to attend the entire Convention and did not arrive in Portland until 3:00 p.m., consequently I missed Dr. Olivera's lecture.

As an avid cowry collector I was most interested in the presentation by Dr. Felix Lorenz on "Identifying Cowries and How to Tell Fakes". Dr. Lorenz's lecture seemed relatively short for the complexity that the title suggested and left the listener wanting more. While the presentation began with identification of members of particular families of cowries in specific regions it quickly diverged into identification philosophies. Apparently, "the world of naturalists is divided into splitter and lumpers" (Dr. Alex Hubert). Dr. Lorenz's philosophy was admittedly "splitter" and he demonstrated some of the positives and negatives of both types of classification methods. Those who had hoped to obtain an in-depth discussion on the identification of fakes were given a brief list of ways in which cowries have been altered and how one might determine those modifications. It was an entertaining lecture which left the audience with a desire for more.

The next day, I attended three lectures. The first was by Bret Raines on "Moai to Microshells" which focused on the endemic mollusks of Easter Island. Mr.

Raines has followed in the footsteps of previous researchers and taken on the daunting task of identifying the species of the Island. He indicated that in the well-researched regions of the Hawaiian Islands approximately 2,500 species of mollusks have been identified. Easter Island presently has only a few hundred listed species and that number is easily expected to exceed 2,500. Due to the amount of work anticipated, Mr. Raines is presently seeking to enlist others who may have an interest in this project. He can be reached at (620) 795-2579.

The second lecture was presented by Dr. Alice Monroe on "Molluscan Predator-Prey Relationships" focusing primarily on methods utilized by fish and mollusks to capture and eat prey. She discussed filter feeding by clams, oysters and other bivalves, the moon shells method of enveloping and holding prey in their foot, the use of venomous harpoons by the fish-eating cones to paralyze prey, the frogfish's method of attracting and baiting prey by wiggling a lure on the end of a dorsal spine in front of its mouth and the use of suction created by quickly opening the mouth by most fish to swallow prey whole. The lecture was short and could have been enhanced with video segments of these fish and mollusks in action.

The last lecture presented by William Belli on "West Africa: Shells, Slaves, and Voodoo" focused on the history, culture and shells of Benin, Togo and Ghana. Mr. Belli gave his presentation dressed in the formal African attire of the region. The lecture was an interesting look into the lives of the peoples of these three small countries in West Africa their history and beliefs. The shells found in this region were only incidentally discussed touching on the use of shells in the making of jewelry and as ornaments on native clothing.

On my last day I attended one presentation before the Bourse. Dr. Henry Chaney, curator for the Santa Barbara Museum of Natural History, gave a very important lecture titled "Who gets all of this when you go?" Dr. Chaney discussed a variety of options most of us have probably considered at one time or another

eventually arriving at what appeared to be the most favorable option – that of donating our collections to a local Natural History Museum. While I do not remember all of the options suggested by Dr. Chaney it basically went like this; you can begin to divest your collection before you “GO” by giving portions of your collection to friends and family. However, as non-shell collectors these highly prized specimens will most likely be discarded over time. You could will portions of your collection to friends and family after you go, unfortunately you will probably encounter the same problem. Correspondingly, if you do not make special arrangements in your will for your collection it may likely succumb to the same fate. You may consider selling your collection either to another collector or to a seller but will only receive 5 to 10 cents on the dollar. The final option was donating your collection to a Natural History Museum. This had the several benefits of saving your collection from the city dump, obtaining a potential tax right-off and expanding the museum’s collection for future research. Dr. Chaney was an excellent speaker and had the audience laughing throughout his presentation.

There were several silent auctions, one in the morning and one in the afternoon with a variety of shells for every collector. Each session began with previewing the lots, bidding on some and waiting to see who bid on others. Circling the tables, following the bids and in the final moments hovering over those hopeful key additions to your collection. The problem with this method is when there are multiple shells of interest that are at opposite ends of the table. This substantially reduces the effectiveness of the hovering technique.

The oral auction was spectacular. The shells being offered for sale were no less than magnificent. As a cowrie collector I can say that the cowries were moder-

ately rare and of the best quality. Most were contributed by John Jackson, a local member of the San Diego Shell Club. It was clear that the bidders also recognized the quality of the shells because the bidding was not for the weak-hearted.

The Banquet was a time to meet new people and mingle with friends. I was honored to be able to share a table with John Jackson, Harry Bedell and Paul Kanner all of whom are members of the San Diego Shell Club. Dinner was followed by a brief entertaining presentation by Dr. Gary Schmelz on “Seashell Adventures” recounting some of the special moments in his trips that made them memorable and in some cases hysterical.

As a born-again shell collector I was completely amazed by the shells on the tables at the Bourse. I have never seen so many shells in one place, except maybe at Don Pisor’s place in Clairemont. There were not only a large number of cowries but a large number of quite rare cowries. I expected to see some of the rarer cowries such as *C. valentia*, *leucodon*, *marginata ketyana*, *jeaniana jeaniana* and *perlae eludens* which were for sale, but there were not less than eight *C. broderipii* “*somalica*”, a golden form of *friendii friendii*, *jeaniana aurata* and *C. teramachii*. Other notables included a ziploc containing no less than seven *C. surinamensis*, several red *C. spadicea* and a number of *C. cribraria exmouthensis*.

A display of shells of such magnitude is dangerous for a collector because we have a tendency to purchase other shells, not specifically ones we are looking for or that are on our lists. If your significant other is not a collector as is mine, this poses a significant problem particularly if you attempt to disavow that you are expanding your collection. All in all the convention was spectacular and I look forward to attending the 2008 convention in San Antonio, Texas.

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The Festivus.
American Museum of Natural
History
Received on: 11-15-07



THE FESTIVUS

A publication of the San Diego Shell Club

ISSN 0738-9388

Volume: XL

January 10, 2008

Number: 1

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Annual dues are payable to San Diego Shell Club.
Membership (includes family). Domestic \$20.00;
Overseas (air mail):\$30.00; Mexico/Canada (air mail):\$20.00.

Address all correspondence to the San Diego Shell Club, Inc.,
c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111, USA.

The Festivus is published monthly except December.
The publication date appears on the masthead above.
Single copies of this issue: \$5.00 plus postage.

Meeting date: third Thursday, 7:30 PM,
Room 104, Casa Del Prado, Balboa Park, San Diego

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PROGRAM

HAWAIIAN SHELLS AND THEIR HABITATS

Member Paul Tuskes will give an illustrated program showing Hawaiian mollusks from the intertidal to a depth of forty feet. He will discuss their habitats and their feeding choices.

Meeting date: January 17, 2008

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CLUB NEWS

San Diego Shell Club Meeting –November 15, 2007

President John LaGrange called the meeting to order at 7:40 p.m. Guests were introduced and the minutes of the last meeting accepted as published in *The Festivus*. A reminder of the Annual Christmas Party was made by Jules Hertz. That evening's entertainment will be provided by Eric Hanauer and his undersea videos. Librarian Marilyn Goldammer called attention to the Book & Reprint Sale of the evening. Botanical Society Representative Wes Farmer asked for photos of the activities of the club for use on the Society's website. Audience suggestions were helpful. Member Hans Bertsch announced that he had brought for sale copies of his newly published book on intertidal life.

President LaGrange had available for distribution, a list of low tides in November and December plus maps of Mission Bay, to be used during our Mission Bay Molluscan Census. Members may collect at their convenience and are asked to provide data concerning date, time, data, and area collected. The Hertzes collected Ski Beach earlier this month; their collection and data methodology were on display. West Fiesta Island has been selected as a good place to start the census. Collection may be by made by diving, finding dead shells, or photography of species. A fishing license is needed for collecting live mollusks. An offer was made by member Benjamin Pister to facilitate another such census in the intertidal area around Cabrillo National Monument in Point Loma.

A motion was made, seconded, and passed to approve the 2008 slate of Club Officers: President Jules Hertz, Treasurer Silvana Vollero, Corresponding Secretary Marilyn Goldammer, and Recording Secretary Paul Tuskes, with Vice-President to be a cooperative effort, at this time, by the Board.

Carole Hertz then introduced the evening's speaker, Daniel Geiger, Research Curator of Electron Microscopy for the Santa Barbara Museum of Natural History. Daniel has been studying scissurellids for seven years. His excellent slide show presentation of these magnified slit-shell species served as an eye-opening education to those assembled. Scissurellids are tiny—from .5mm to 10.5mm each, with the majority being on the tiniest side. There are 160 described species, with another 5 to 100 undescribed species, living from the intertidal to depths exceeding 3,000 meters, including around hydrothermal vents. Peak diversity occurs in the

Indo-Malay part of the world. Yet, some have been found in our Mission Bay! And he would appreciate receiving any specimens (impossible to see) that our census may discover (by brushing rocks found in algae). The species that has been found in Mission Bay, *Coronadoa simonsae* Bartsch, 1946, is without the usual slit. Many questions came from the audience after his well-done presentation.

The Door Prize was won by Debbie Caturius, followed by adjournment at 8:55 p.m. to the Coffee Table and Book and Reprint Sale.

Respectfully submitted for the last time,
Nancy Schneider

The Club's Annual Christmas Dinner Party Saturday, December 1st

The Club's annual Christmas Dinner Party on Saturday, December 1st in the Board Room at the Butcher Shop in San Diego was a huge success! Members and guests enjoyed the delicious meal, terrific companions, a wonderful underwater program by Eric Hanauer on diving on wrecks in Bikini Atoll and also diving with humpback whales. There was also the fun of the gift exchange and drawings for the table centerpieces. MC Carole Hertz kept things moving and fun and Wes Farmer took some great photos which will be seen at a future meeting. It was a fun time for all.

A Message from the Librarian

Our club maintains a wonderful library for the benefit of its members. We hope that you will take the opportunity to utilize and enjoy it. At the next meeting, why not take the time to explore the numerous publications, including issues of *The Veliger* and *The Nautilus*. Publications may be checked out easily from the library for a period of one month. Other current monthly reprints and publications are available as well, and many may be purchased for a nominal fee.

A limited number of copies of the Club's Library List are on hand in the library. Members also may obtain a copy via e-mail by contacting me at mgoldammer@san.rr.com.

Marilyn Goldammer

DUES ARE DUE if you wish to be included on the 2008 roster which will appear in the February issue.

NEW DISTRIBUTIONAL INFORMATION FOR PANAMIC PROVINCE PYRAMIDELLIDAE (GASTROPODA)

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Abstract

The Pyramidellidae is a group of very small ectoparasites (Robertson & Orr, 1961; Ward, 1989) with a world-wide distribution. The distinctive shell characters of the family are the heterostrophic protoconch and the columellar folds. Very little has been published about the distribution of these species. Listed herein (Table 1) are new records for 42 species that have been found within the Panamic Province. Most are illustrated in two views, one of the entire shell and, where possible, one of the protoconch.

Introduction

A synopsis of the pyramidellid genera by Dall and Bartsch (1904) points out some of the problems in working with this group. Very few live specimens were known, so the divisions into genera and subgenera were based on shell characters alone. Many shells have characteristics of more than one genus which made placement difficult. Only four new species were included in this work and they were the types of new subgenera proposed in the paper. None were from the Panamic Province and none were figured. According to the authors this was a preliminary work to be followed by another one at a later date.

In 1909 Dall and Bartsch published *A Monograph of West American Pyramidellid Mollusks*. This massive paper included 30 plates of line drawings with as many as 16 species per plate. Each of the almost 340 species included was described and localities were given. Over 75 of these species were from the Panamic Province.

Keys to the genera were provided, some of which had minor changes since the 1904 paper. A historical account of species described by other authors before 1908 was also included.

Useful references for the many Panamic species that have been described since Dall & Bartsch (1909) include the following: Bartsch, 1917; Baker, Hanna & Strong, 1928; Pilsbry & Lowe, 1932; Lowe, 1935; Strong & Hertlein, 1939; Strong, 1949; Hertlein &

Strong, 1951.

Turner (1956) illustrated the eastern Pacific mollusks described by C. B. Adams. Palmer (1958) illustrated Carpenter type material from San Diego to British Columbia. Brann (1966) illustrated Carpenter's 1857 *Catalogue of the Collection of Mazatlan Shells*.

Keen (1971) listed 351 species of pyramidellids as occurring within the Panamic Province. Changes in upper level taxa since Keen (1971) include Robertson (1978), who created the new genus *Boonea* in which he included six eastern Pacific odostomioid species; Wise (1996) who placed *Chrysallida cincta* Carpenter, 1864, in the genus *Boonea*, figured the anatomy and listed ten synonyms of *Boonea cincta*, all from the tropical eastern Pacific, nine of which were from Dall and Bartsch (1909). Odé (1996) listed taxa from the west coast of the Americas with many comments. He raised several subgenera to the genus level and synonymized several species; Odé believed that 50% of the taxa listed were synonyms. These changes, and the many papers since Keen (1971) that have included new distributional information, have been summarized in Skoglund (2002). This summary is the basis of the listings herein.

Methods

Because pyramidellid mollusks are usually minute in size they require special collecting and a microscope must be used for identification. The pyramidellids in this

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study were taken over more than 40 years by my late husband Paul and me as a result of many collecting trips in areas ranging from Bahía Magdalena, Baja California Sur, throughout the Golfo de California, and southern México, to Costa Rica, Panamá and Ecuador. We did mostly small-boat dredging and carefully kept the grunge from the bottom of each dredge load. This material was washed through sieves of several sizes and dried on cloths laid on the sand. The larger grunge was then sorted for shells. Not so with what went through the smallest sieve. This material was dried and placed in cloth bags for the return trip to Phoenix, Arizona. It was then sorted, a half teaspoon at a time, using a dissecting microscope. Over the years I found many hundreds of Pyramidellidae. Many of these were extremely beautiful and well worth the time involved.

A second productive method for collecting all micro shells including Pyramidellidae was to check the top of the high tide line for species that might have washed in. This was done by first wetting my hand, then placing it gently on the sand at the high tide line. Usually a single layer of sand would adhere to my hand, and if there were shells present I could easily see them. If the results looked good, a thin layer of the sand was scooped up, sieved, dried and sacked to be sorted later.

Problems came with trying to identify individual species. My usual way to handle material is, after placing it in a family, to sort by genus and then to the subgenus level and finally to species. With many specimens in this group it was not possible to be sure of a genus, as a given shell could have some characteristics of two different genera. Because of these problems very few of those collected by us were identified.

Discussion

About 500 lots of Pyramidellidae in the Skoglund Collection, which includes the shells listed herein (pls. 1-11), is now part of the collection of the Santa Barbara Museum of Natural History (SBMNH) in Santa Barbara, California. Some of the lots not included in this paper have multiple species. My hope is that some future student will take on the job of correcting the taxonomic literature, then identifying these shells so we can know more about their distributions. Most of these shells were empty when taken so anatomical studies would not be possible. As discussed by Dall and Bartsch, what does become apparent when studying large lots is that many of the shells that were given separate species names can be seen to belong to a single variable species. Of course the opposite is also true. Many of these shells have yet to be named.

Acknowledgments

I am grateful to Carole & Jules Hertz who drove several hundred miles to help confirm my species identifications and to suggest manuscript changes. I owe a big debt of gratitude to the staff of the Santa Barbara Museum of Natural History: Daniel L. Geiger used the Scanning Electron Microscope, supported in part by NSF MRI 0420706 grant to Henry W. Chaney, to take the photos and Paul Valentich-Scott photographed the larger specimens and generously spent the time to make the beautiful finished plates.

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Table I. NEW DISTRIBUTIONAL RECORDS FOR PANAMIC PYRAMIDELLID SPECIES

The most northern and/or southern new distributional sites are shown for the 42 pyramidellid species listed. Additional localities are listed if, for example, they fall on both the outer coast of Baja California and also within the Golfo de California. For many species there are several intervening lots in the collection that are not listed.

* Species previously in the genus *Odostomia* have an asterisk before the new genus name.

Species previously in the genus *Turbonilla* have a pound sign before the new genus name.

Plate/ figure	SPECIES NAME with type locality	SBMNH catalogue number	NEW DISTRIBUTION RECORDS All specimens collected by Paul and Carol Skoglund except where noted
PYRAMIDELLINAE			
Pl. 1, figs. 1a,b	<i>Pyramidella (Pharcidella) achates</i> (Gould, 1853). Santa Barbara, California	369672	Bahía de Cuastecomate, Jalisco, México. Dredged 12-30 m. Dec. 1974.
Pl. 1, figs. 2a,b	<i>Pyramidella (Pharcidella) hastata</i> (A. Adams in Sowerby, 1854)	369684	Bahía la Cholla, Sonora, México. Intertidal, -4 tide. Sept. 1971 & Jun. 1973.
Pl. 1, figs. 3a,b	<i>Pyramidella (Voluspa) linearum</i> Pilsbry & Lowe, 1932 Acapulco, Guerrero, México	369644	Puerto San Carlos, Bahía Magdalena, Baja California Sur, México. Dredged, 2-10 m, sand, Oct. 1979.
ODOSTOMIINAE			
Pl. 2, figs. 1a,b	* <i>Besla convexa</i> (Carpenter, 1857) Cacachitas, Golfo de California, México	369643	La Cruz de Huanacastle, Bahía de Banderas, Nayarit, México. Dredged 30-40 m, mud, Dec. 1972.
Pl. 2, figs. 2a,b	* <i>Chrysallida acrybia</i> (Dall & Bartsch, 1909) Punta Abreojos, Baja California, México	365678	Sandy (Norse) Beach, Puerto Peñasco, Sonora, México. Intertidal, - 2 ft tide, sand, Feb. 1972. Puerto Libertad, Sonora, México.
Pl. 2, figs. 3a,b	* <i>Chrysallida excelsa</i> (Dall & Bartsch, 1909) Bahía de Panamá, Panamá	369661	Off east entrance of Bahía Concepción, Baja California Sur, México. Dredged, 45-60 m, Apr. 1972, Jim Bailey & Pete Barker, collectors.
Pl. 2, figs. 4a,b	* <i>Chrysallida fasciata</i> (Carpenter, 1857) Mazatlán, Sinaloa, México	369649	Estero Morua, south of Puerto Peñasco, Sonora, México. In drift at high tide line, Jul. 1970.
Pl. 3, figs. 1a,b	* <i>Chrysallida oonisca</i> (Dall & Bartsch, 1909) Mazatlán, Sinaloa, México	369675	Off east entrance of Bahía Concepción, Baja California Sur, México. Dredged, 45- 60 m, Apr. 1972, Jim Bailey & Pete Barker, collectors.
Pl. 3, figs. 2a,b	* <i>Chrysallida rotundata</i> (Carpenter, 1857) Mazatlán, Sinaloa, México	369654	Bahía de Panamá, Panamá. In commercially dredged sand, Apr. 1981 & Feb. 1985.
Pl. 3, figs. 3a,b	* <i>Chrysallida vizcainoana</i> (Baker, Hanna & Strong, 1928) La Paz, Baja California, Sur, México	369676	Campo Uno, San Felipe, Baja California, México. Under rock at low tide, May 1975.
Pl. 3, fig. 4	* <i>Evalea gallegosiana</i> (Hertlein & Strong, 1951) Puerto Huatulco, Oaxaca, México	369648	Puerto San Carlos, Bahía Magdalena, Baja California Sur, México. Dredged, 2-10 m, Sept. 1976. Cabo Tepoca, Sonora, México. Dredged 20-30 m Kobbe Beach, Canal Zone, Panamá. Intertidal, Feb. 1985.

Pl. 4, figs. 1a,b.	* <i>Evalea lucasana</i> (Dall & Bartsch, 1909) Cabo San Lucas, Baja California Sur, México	369646	Off Isla San Marcos, south of Santa Rosalía, Baja California Sur, México. On <i>Spondylus princeps</i> taken by local divers at 12 m.
Pl. 4, figs. 2a,b	* <i>Evalea raymondi</i> (Dall & Bartsch, 1909) Catalina Island, California	369686	Off N.W. Isla Smith, Bahía de los Angeles, Baja California, México. Dredged, 183 m, May 1980 & May 1994.
Pl. 4, figs. 3a,b	* <i>Evalina tehuantepecana</i> (Hertlein & Strong, 1951) Puerto Huatulco, Oaxaca, México	369687	Santa Cruz, Nayarit, México. In drift at high tide line, Dec. 1967 & Jan. 1980.
Pl. 4, figs. 4a,b	* <i>Iolaea eucosmia</i> (Dall & Bartsch, 1909) Punta Abreojos, Baja California, México.	369677	Off N.W. Isla Smith, Bahía de los Angeles, Baja California, México. Dredged, 183 m, May 1980 & May 1991.
Pl. 5 figs. 1a,b	* <i>Ivara turricula</i> (Dall & Bartsch in Arnold, 1903)	369650	Santa Cruz, Nayarit, México. In drift at high tide line, Jan. 1980.
Pl. 5 figs. 2a,b	* <i>Ividella mendozæ</i> (Baker, Hanna & Strong, 1928) Cabo San Lucas, Baja California Sur, México	369681	Off Punta la Gringa, Bahía de los Angeles, Baja California, México. Dredged, 20-40 m, May 1976 & May 1994. Barra de Navidad, Jalisco, México. Dredged, 3-45 m, Dec. 1972.
Pl. 5 figs. 3a,b	* <i>Ividella ulloana</i> (Strong, 1949) La Paz, Baja California Sur, México	369668	Estero Morua, south of Puerto Peñasco, Sonora, México. In drift at high tide line, 1968 to 1978.
Pl. 5 figs. 4a,b	* <i>Menestho aequisculpta</i> (Carpenter, 1864) Cabo San Lucas, Baja California Sur, México	369645	Off Bahía San Carlos, Sonora, México. Dredged, 3-45 m, Dec 1972.
Pl. 6 figs. 1a,b	* <i>Menestho callipyrga</i> (Dall & Bartsch, 1904) Isla Margarita, Bahía de Panamá, Panamá	269669	Off east entrance of Bahía Concepción, Baja California Sur, México. Dredged, 45-60 m, Apr. 1972, Jim Bailey & Pete Barker, collectors.
Pl. 6 figs. 2a,b	* <i>Menestho ciguatanis</i> (Strong, 1949) Golfo de California, México	369657	Off Bahía la Cholla, Sonora, México. Dredged, 6-16 m, Apr. 1972. Off Punta Arco, Guaymas, Sonora, México Dredged, 30-40 m, Jul. 1975.
Pl. 6 figs. 3a,b	* <i>Menestho grammatospira</i> (Dall & Bartsch, 1903) Cabo San Lucas, Baja California Sur, México	369671	Santa Cruz, Nayarit, México. In drift at high tide line, Dec. 1968.
Pl. 6 figs. 4a,b	* <i>Miralda armata</i> (Carpenter, 1857) Mazatlán, Sinaloa, México	369655	Off Punta la Gringa, Bahía de los Angeles, Baja California, México. Dredged, 20-40 m, May 1976 & May 1994.
Pl. 7 fig. 1	* <i>Miralda exarata</i> (Carpenter, 1857) Mazatlán, Sinaloa, México	369647	Estero Morua, south of Puerto Peñasco, Sonora, México. In drift at high tide line, Jun. 1968.
Pl. 7 figs. 2a,b	<i>Odostomia (Pyrgulina) herrerae</i> Baker, Hanna & Strong, 1928 Golfo de California, México	365680	Bahía la Cholla, Sonora, México. In drift at high tide line, Nov. 1966.
Pl. 7 fig. 3	<i>Odostomia (Pyrgulina) marginata</i> (C. B. Adams, 1852) Panamá	369664	Off east entrance to Bahía Concepción, Baja California Sur, México. Dredged, 45-60 m, Apr. 1972, Jim Bailey & Pete Barker, collectors.
Pl. 7 figs. 4a,b	<i>Peristichia pedroana</i> (Dall & Bartsch, 1909) San Pedro, California	369651	Off Punta la Gringa, Bahía de los Angeles, Baja California, México. Dredged, 20-40 m, May, 1976 & May 1991.

Pl. 8 fig. 1	# <i>Salassia juani</i> (Bartsch, 1917) Bahía Magdalena, Baja California Sur, México	369660	Off N.W. Isla Smith, Bahía de los Angeles, Baja California, México. Dredged, 183 m, May 1980 & May 1994.
TURBONILLINAE			
Pl. 8 figs. 2a,b	# <i>Careliopsis hanna</i> (Strong, 1938) Islas Tres Marias, México	369667	Puerto San Carlos, Bahía Magdalena, Baja California Sur, México. Dredged, 2-10 m, Oct. 1979. Bahía de Panamá, Panamá. Commercially dredged sand, Apr. 1981.
Pl. 8 figs. 3a,b	# <i>Chemnitzia aculeus</i> (C. B. Adams, 1852) Panamá	369673	Puerto San Carlos, Bahía Magdalena, Baja California Sur, México. Dredged, 2-10 m, Oct. 1979.
Pl. 8 figs. 4a,b	# <i>Chemnitzia hypolispa</i> (Dall & Bartsch, 1909) San Diego, California	369688	Off San Felipe, Baja California, México. Dredged, 15-20 m, Mar. 1976, Peter & Sally Bennett.
Pl. 9 figs. 1a,b	# <i>Chemnitzia muricatoides</i> (Dall & Bartsch, 1909) Monterey, California	369653	Puerto San Carlos, Bahía Magdalena, Baja California Sur, México. Dredged, 2-10 m, Oct. 1979.
Pl. 9 figs. 2a,b	# <i>Cingulina evermanni</i> (Baker, Hanna & Strong, 1928) Isla San José, Golfo de California, México	369682	Puerto San Carlos, Bahía Magdalena, Baja California Sur, México. Dredged, 2-10 m, Oct. 1979. Estero Morua, south of Puerto Peñasco, Sonora, México. In drift at high tide line, 1968 to 1978.
Pl. 9 fig. 3	# <i>Ptycheulimella penascoensis</i> (Lowe, 1935) Puerto Peñasco, Sonora, México	369674	La Cruz de Huanacastle, Nayarit, México. Dredged, 7-20 m, mud bottom, Dec. 1972 to Dec. 1979.
Pl. 9 figs. 4a,b	# <i>Pyrgiscus azteca</i> (Baker, Hanna & Strong, 1928) San Luis Gonzaga, Baja California, México	369652	Bahía de Cuastecomate, Jalisco, México. Dredged, 12-30 m, Dec. 1974 to Jan. 1979.
Pl. 10 figs. 1a,b	# <i>Pyrgiscus ceralva</i> (Dall & Bartsch, 1909) La Paz, Baja California Sur, México	369659	Puerto San Carlos, Bahía Magdalena, Baja California Sur, México. Dredged, 2-10m, Oct. 1979. Bahía la Cholla, Sonora, México. Intertidal, Bahía Panamá, Panamá. Commercially dredged sand, Apr. 1981.
Pl. 10 figs. 2a,b	# <i>Pyrgiscus mariana</i> (Bartsch, 1917) Bahía Santa Maria, Baja California Sur, México	369670	Estero Morua, south of Puerto Peñasco, Sonora, México. In drift at high tide line, 1968 to 1978.
Pl. 10 figs. 3a,b	<i>Turbonilla (Asmunda) turrita</i> (C. B. Adams, 1852) Panamá	369665	Estero Morua, south of Puerto Peñasco, Sonora, México. In drift at high tide line, Jun. 1978. Off east entrance of Bahía Concepción, Baja California Sur, México. Dredged, 45-60 m, Apr. 1972, Jim Bailey & Pete Barker, collectors.
Pl. 10 figs. 4a,b	<i>Turbonilla (Bartschella) semela</i> Bartsch, 1924 Bahía Santa Elena, Ecuador	369658	Off Requesón, Bahía Concepción, Baja California Sur, México. Dredged, 8-20 m, Nov. 1972 to Nov. 1990.
Pl. 11 fig. 1	<i>Turbonilla (Bartschella) vestae</i> Hertlein & Strong, 1951 Corinto, Nicaragua	369666	Manzanillo, Colima, México. Dredged, 10-30 m, Aug. 1973.
Pl. 11 figs. 2a,b	<i>Turbonilla (Dunkeria) andrewsi</i> Dall & Bartsch, 1909 Panamá	369683	Bahía la Cholla, Sonora, México. Intertidal, Oct. 1972.
Pl. 11 figs. 3a,b	<i>Turbonilla (Mormula) coyotensis</i> Baker, Hanna & Strong, 1928 Bahía Concepción, Baja California Sur, México	369685	Los Frailes, Baja California Sur, México. Dredged, Peter & Sally Bennett, collectors.

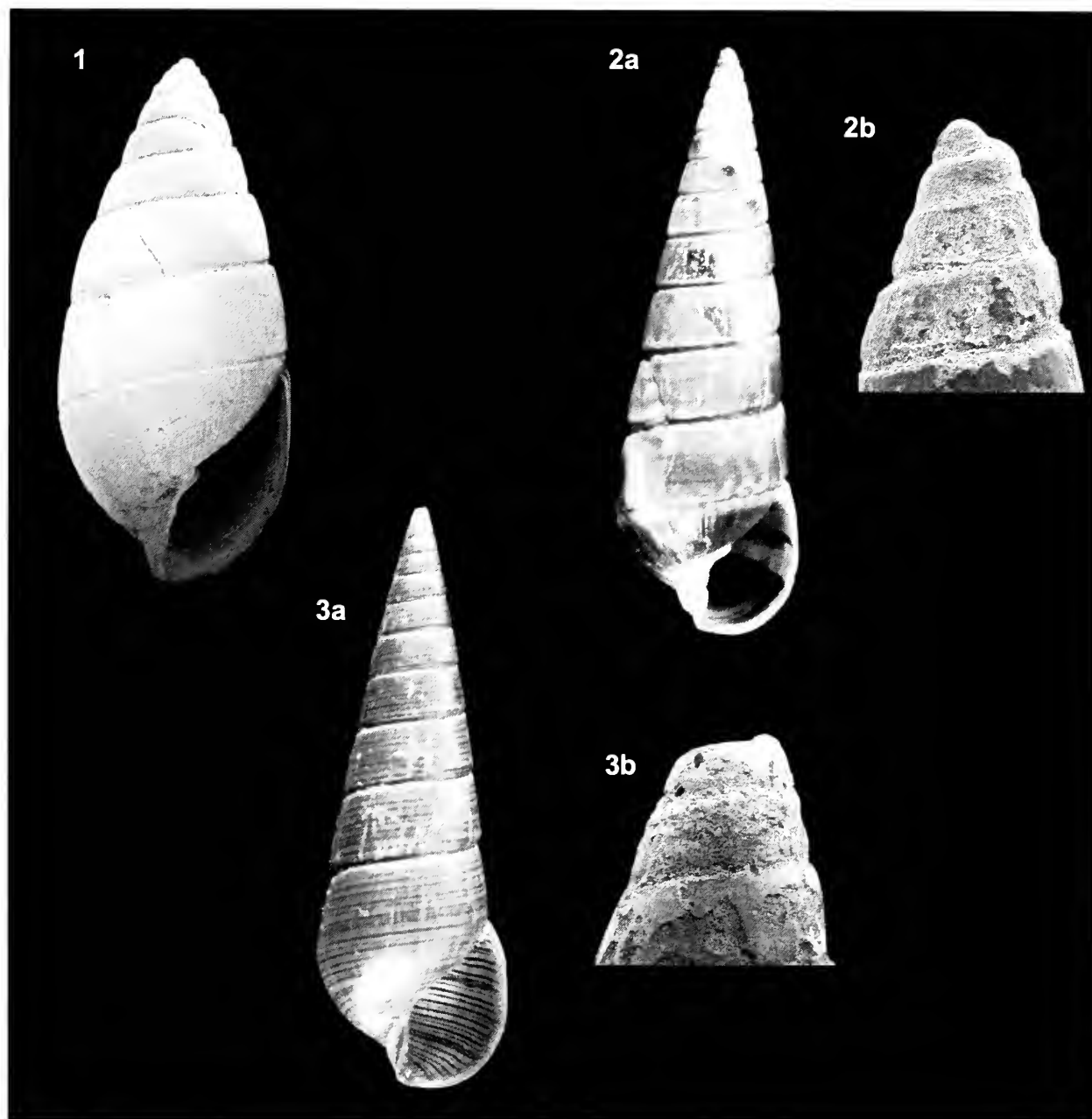


Plate 1, Figure 1 *Pyramidella (Pharcidella) achates* (Gould, 1853), SBMNH 369672, shell height = 8.377 mm. **Figure 2a, b** *Pyramidella (Pharcidella) hastata* (A. Adams in Sowerby, 1854), SBMNH 369684, a) shell height = 13.25 mm; b) protoconch image height = 1002 μ m. **Figure 3a, b** *Pyramidella (Voluspa) linearum* Pilsbry & Lowe, 1932, SBMNH 369644, a) shell height = 17.00 mm; b) protoconch image height 794 μ m. SEM micrographs by Daniel Geiger, light photographs by Paul Valentich-Scott, digital editing by Paul Valentich-Scott.

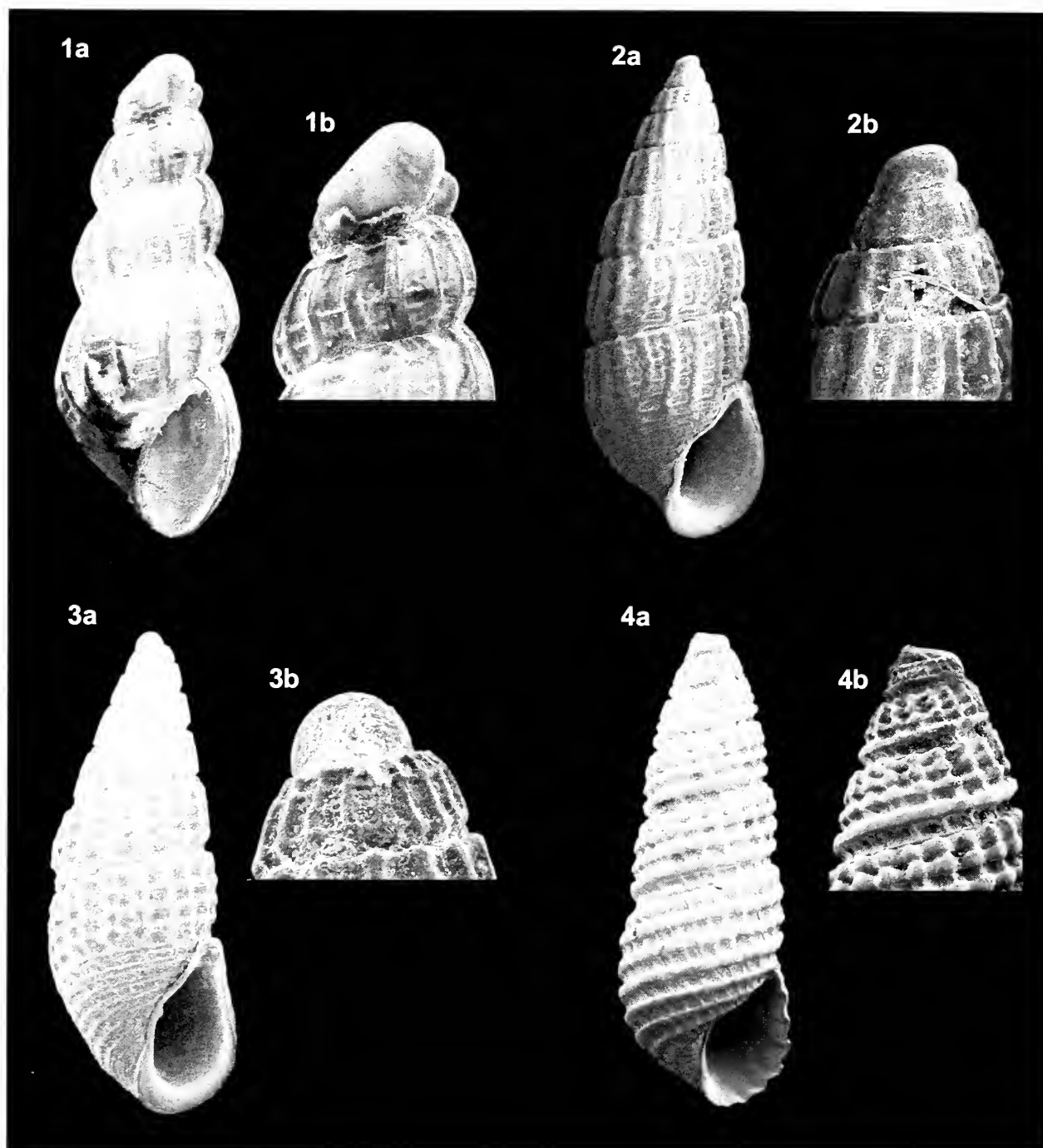


Plate 2, Figure 1a, b *Besla convexa* (Carpenter, 1857), SBMNH 369643, a) shell height = 1.292 mm; b) protoconch image height = 553 μ m. **Figure 2a, b** *Chrysallida acrybia* (Dall & Bartsch, 1909), SBMNH 365678, a) shell height = 3.994 mm; b) protoconch image height = 695 μ m. **Figure 3a, b** *Chrysallida excelsa* (Dall & Bartsch, 1909), SBMNH 369661, a) shell height = 3.205 mm; b) protoconch image height = 306 μ m. **Figure 4a, b** *Chrysallida fasciata* (Carpenter, 1857), SBMNH 369649, a) shell height = 3.218 mm; b) protoconch image height = 951 μ m. SEM micrographs by Daniel Geiger, digital editing by Paul Valentich-Scott.

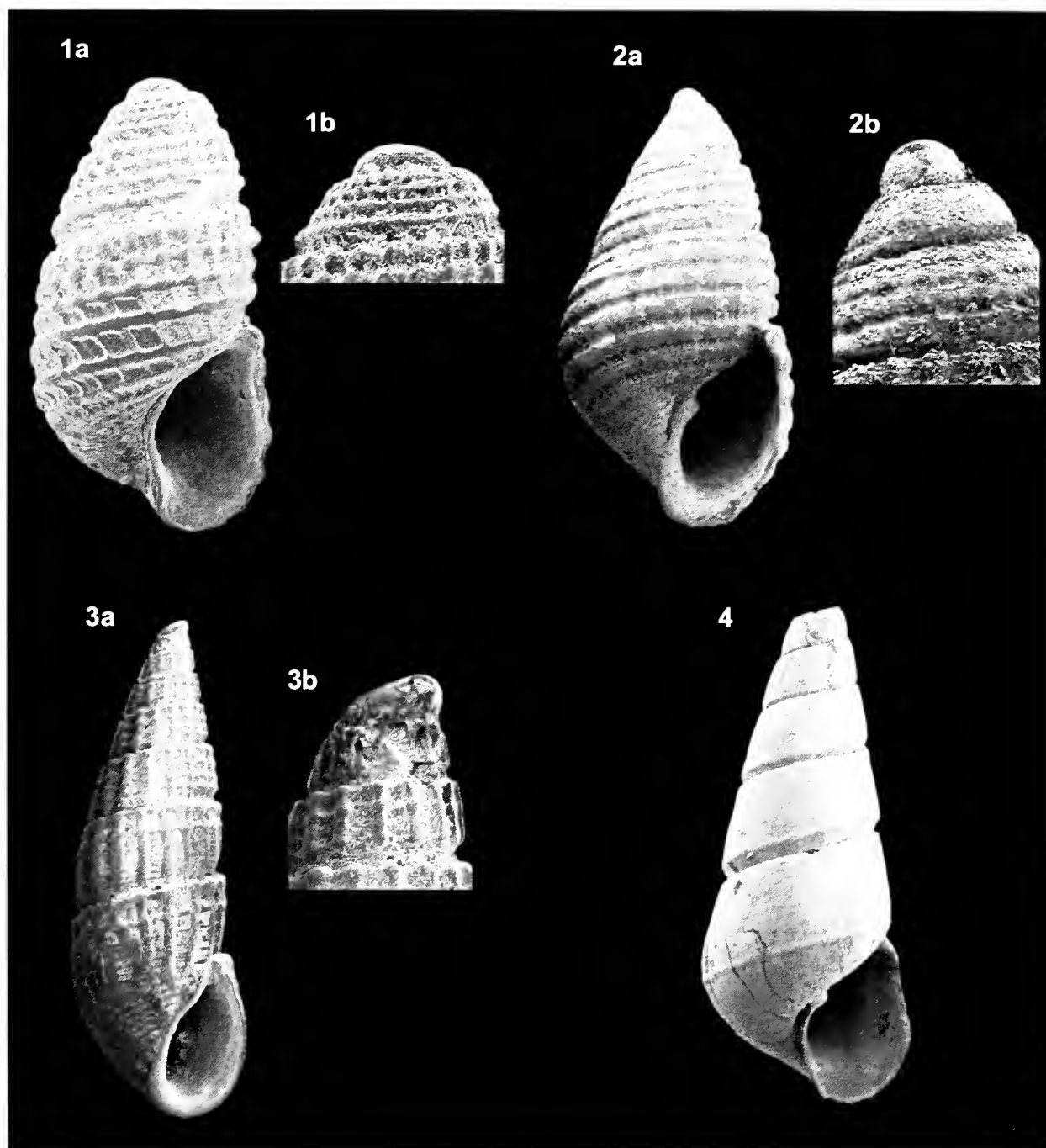


Plate 3, Figure 1a, b *Chrysallida oonisca* (Dall & Bartsch, 1909), SBMNH 369675, a) shell height = 1.539 mm; b) protoconch image height = 294 μ m. **Figure 2a, b** *Chrysallida rotundata* (Carpenter, 1857), SBMNH 369654, a) shell height = 2.201 mm; b) protoconch image height = 490 μ m. **Figure 3a, b** *Chrysallida vizcainoana* (Baker, Hanna & Strong, 1928), SBMNH 369676, a) shell height = 4.396 mm; b) protoconch image height = 583 μ m. **Figure 4** *Evalea gallegosiana* (Hertlein & Strong, 1951), SBMNH 369648, a) shell height = 3.016 mm. SEM micrographs by Daniel Geiger, digital editing by Paul Valentich-Scott.

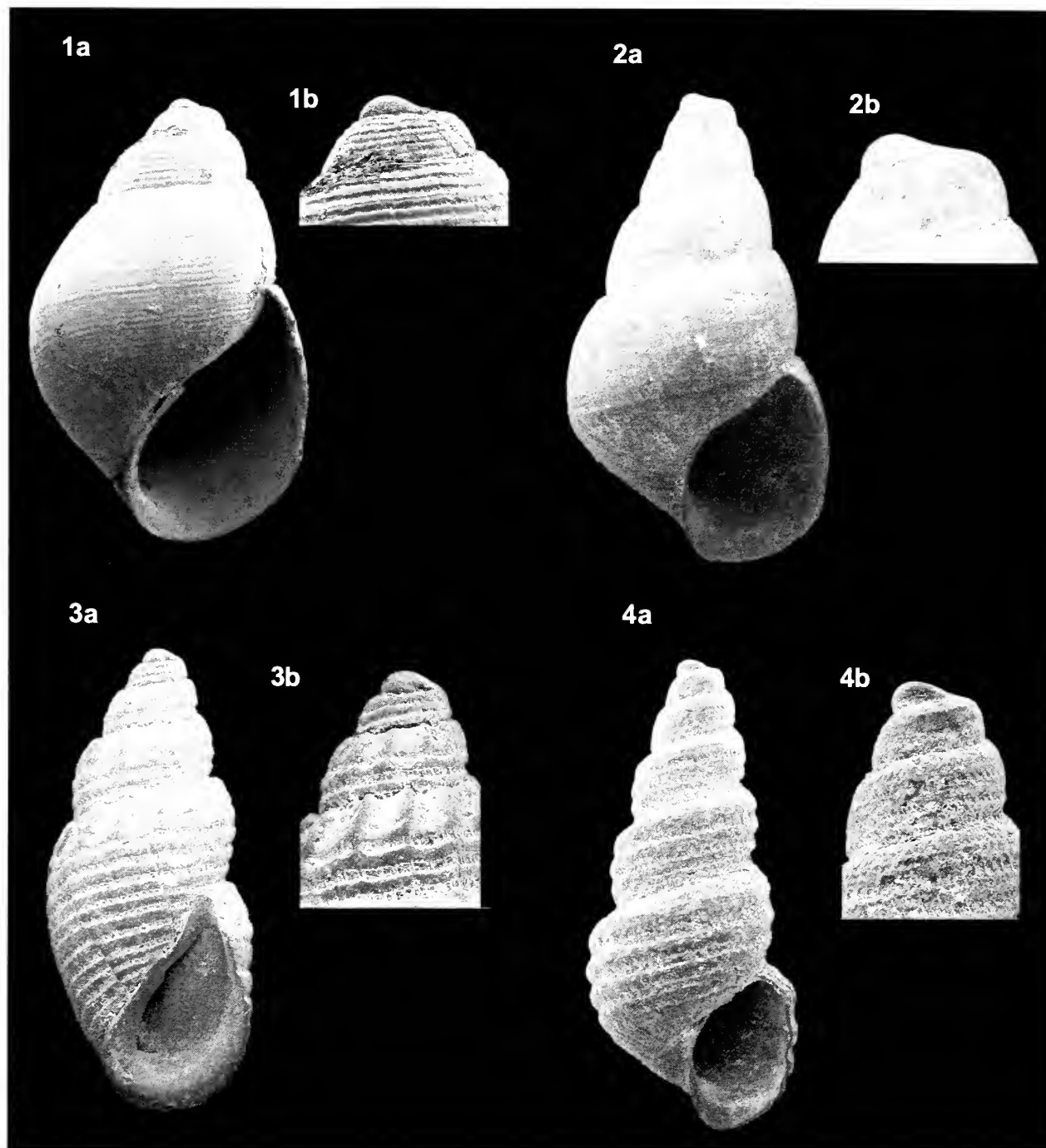


Plate 4, Figure 1a, b *Evalea lucasana* (Dall & Bartsch, 1909), SBMNH 369646, a) shell height = 2.352 mm; b) protoconch image height = 349 μ m. **Figure 2a, b** *Evalea raymondi* (Dall & Bartsch, 1909), SBMNH 369686, a) shell height = 2.568 mm; b) protoconch image height = 267 μ m. **Figure 3a, b** *Evalina tehuntepecana* (Hertlein & Strong, 1951), SBMNH 369687, a) shell height = 2.125 mm; b) protoconch image height = 649 μ m. **Figure 4a, b** *Iolaea encosmia* (Dall & Bartsch, 1909), SBMNH 369677, a) shell height = 2.800 mm; b) protoconch image height = 745 μ m. SEM micrographs by Daniel Geiger, digital editing by Paul Valentich-Scott.

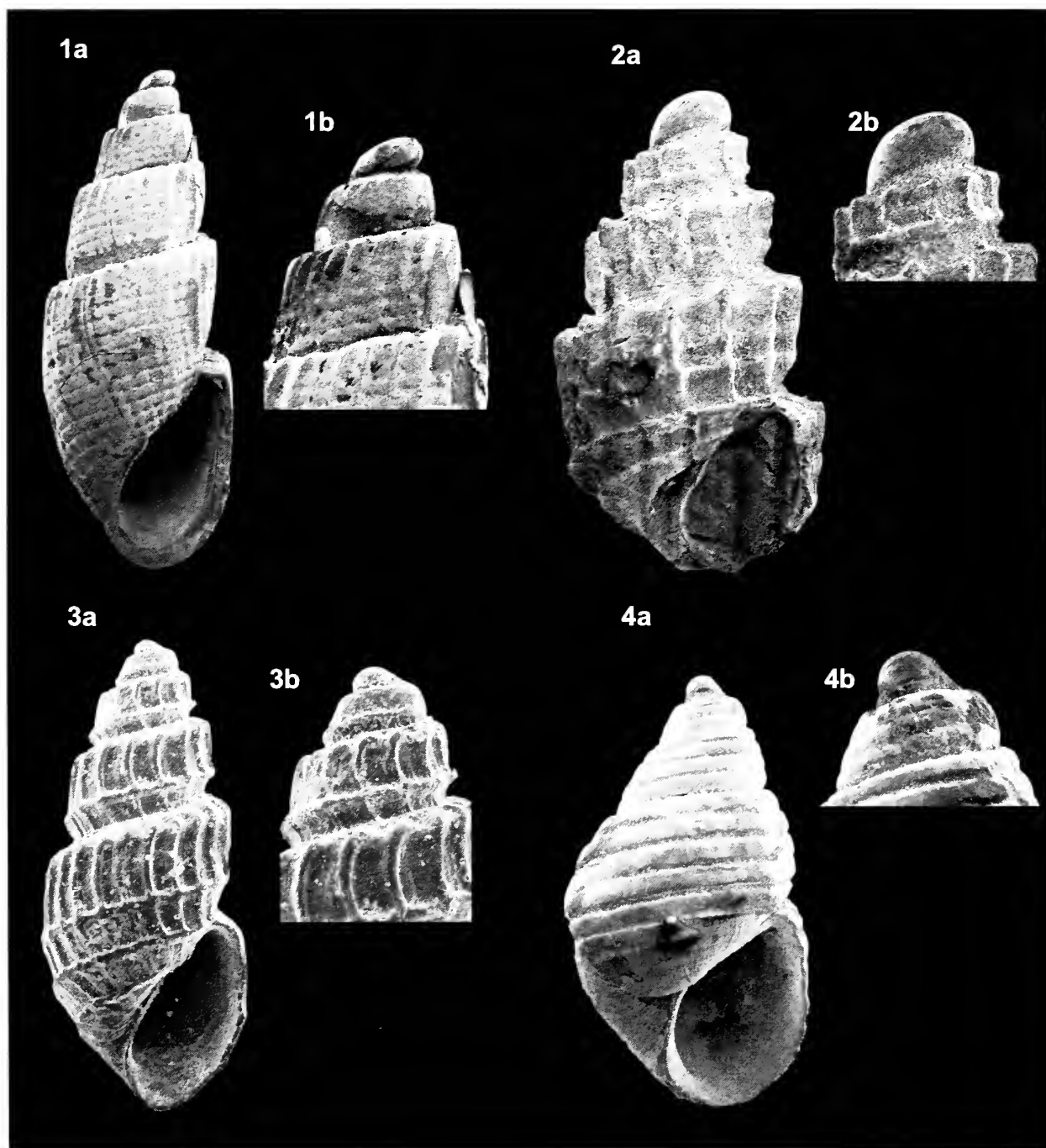


Plate 5, Figure 1a, b *Ivara turricula* (Dall & Bartsch in Arnold, 1903), SBMNH 369650, a) shell height = 3.491 mm, b) protoconch image height = 1002 μ m. **Figure 2a, b** *Ividella mendozae* (Baker, Hanna & Strong, 1928), SBMNH 369681, a) shell height = 1.366 mm; b) protoconch image height = 356 μ m. **Figure 3a, b** *Ividella ulloana* (Strong, 1949), SBMNH 369668, a) shell height = 2.176 mm; b) protoconch image height = 706 μ m. **Figure 4a, b** *Menestho aequisculpta* (Carpenter, 1864), SBMNH 369645, a) shell height = 1.512 mm; b) protoconch image height = 283 μ m. SEM micrographs by Daniel Geiger, digital editing by Paul Valentich-Scott.

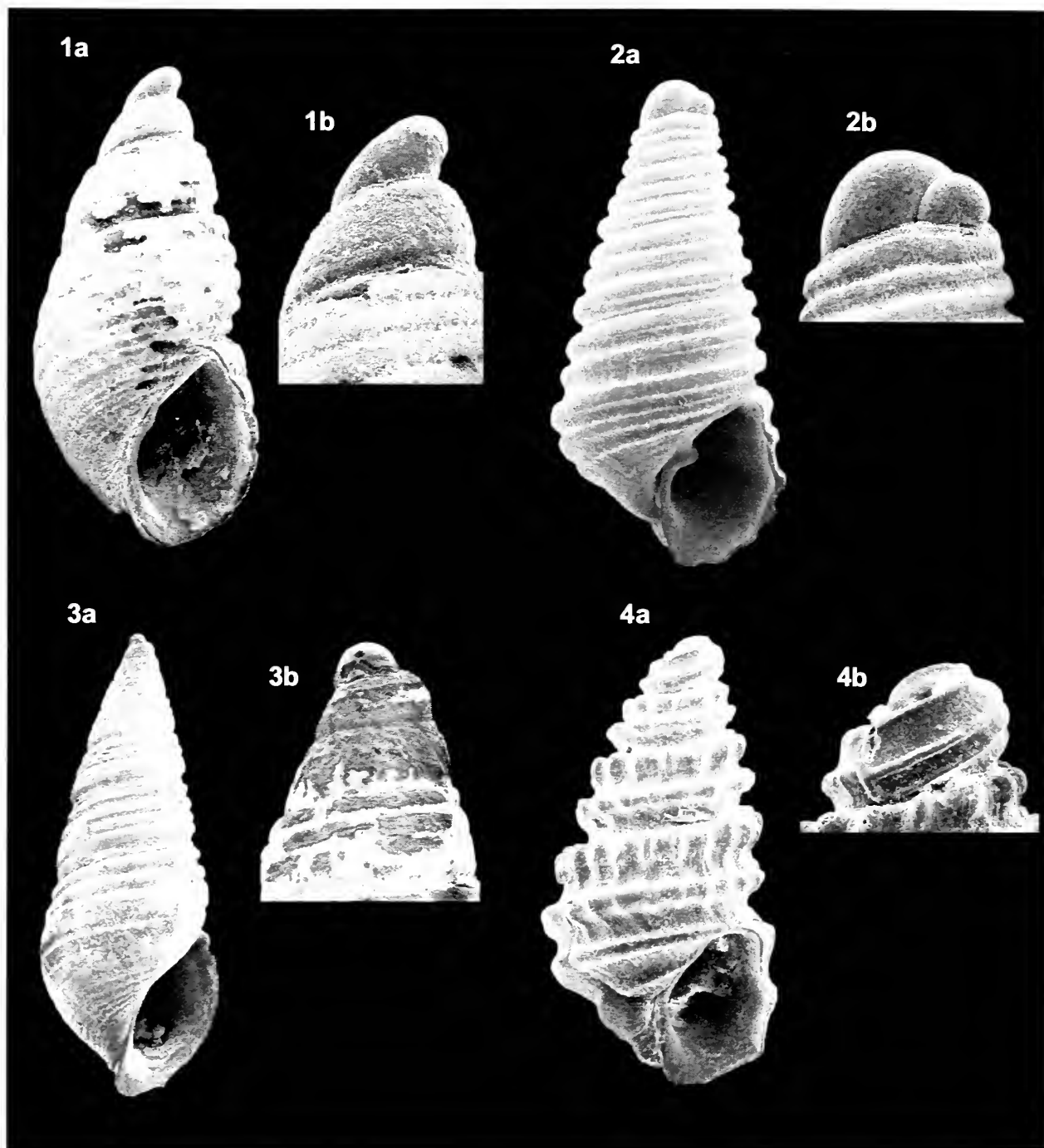


Plate 6. Figure 1a, b *Menestho callipyrga* (Dall & Bartsch, 1904). SBMNH 369669, a) shell height = 1.862 mm; b) protoconch image height = 518 μ m. **Figure 2a, b** *Menestho ciguataensis* (Strong, 1949). SBMNH 369657, a) shell height = 2.074 mm; b) protoconch image height = 326 μ m. **Figure 3a, b** *Menestho grammatospira* (Dall & Bartsch, 1903). SBMNH 369671, a) shell height = 4.929 mm; b) protoconch image height = 762 μ m. **Figure 4a, b** *Miralda armata* (Carpenter, 1857). SBMNH 369655, a) shell height = 1.438 mm; b) protoconch image height = 245 μ m. SEM micrographs by Daniel Geiger, digital editing by Paul Valentich-Scott.

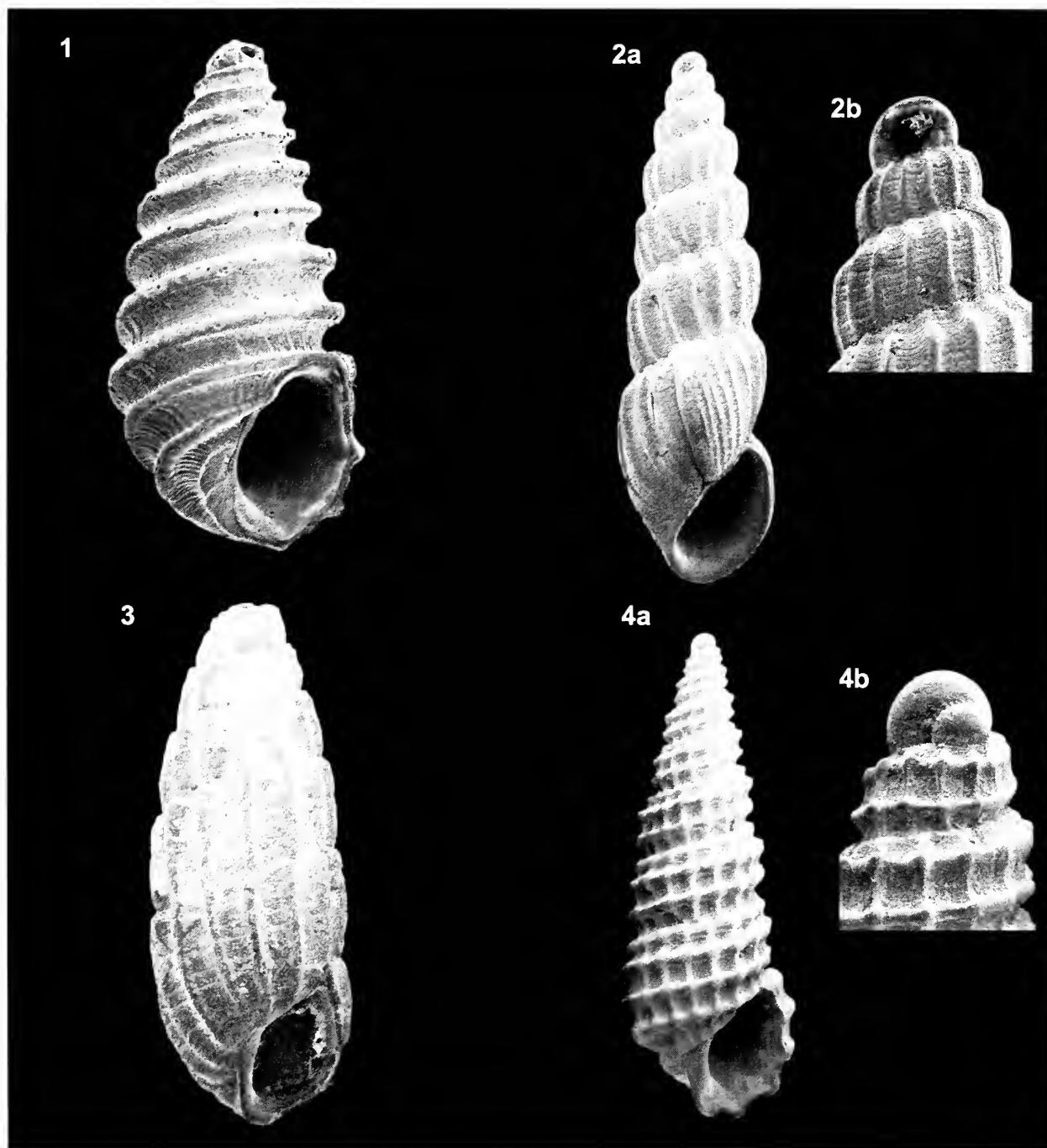


Plate 7, Figure 1 *Miralda exarata* (Carpenter, 1857), SBMNH 369647, a) shell height = 1.793mm. **Figure 2a, b** *Odostomia (Pyrgulina) herrerae* Baker, Hanna & Strong, 1928, SBMNH 365680, a) shell height = 4.163 mm; b) protoconch image height = 865 μ m. **Figure 3** *Odostomia (Pyrgulina) marginata* (C. B. Adams, 1852), SBMNH 369664, a) shell height = 2.648 mm. **Figure 4a, b** *Peristichia pedroana* (Dall & Bartsch, 1909), SBMNH 369651, a) shell height = 4.552 mm; b) protoconch image height = 613 μ m. SEM micrographs by Daniel Geiger, digital editing by Paul Valentich-Scott.

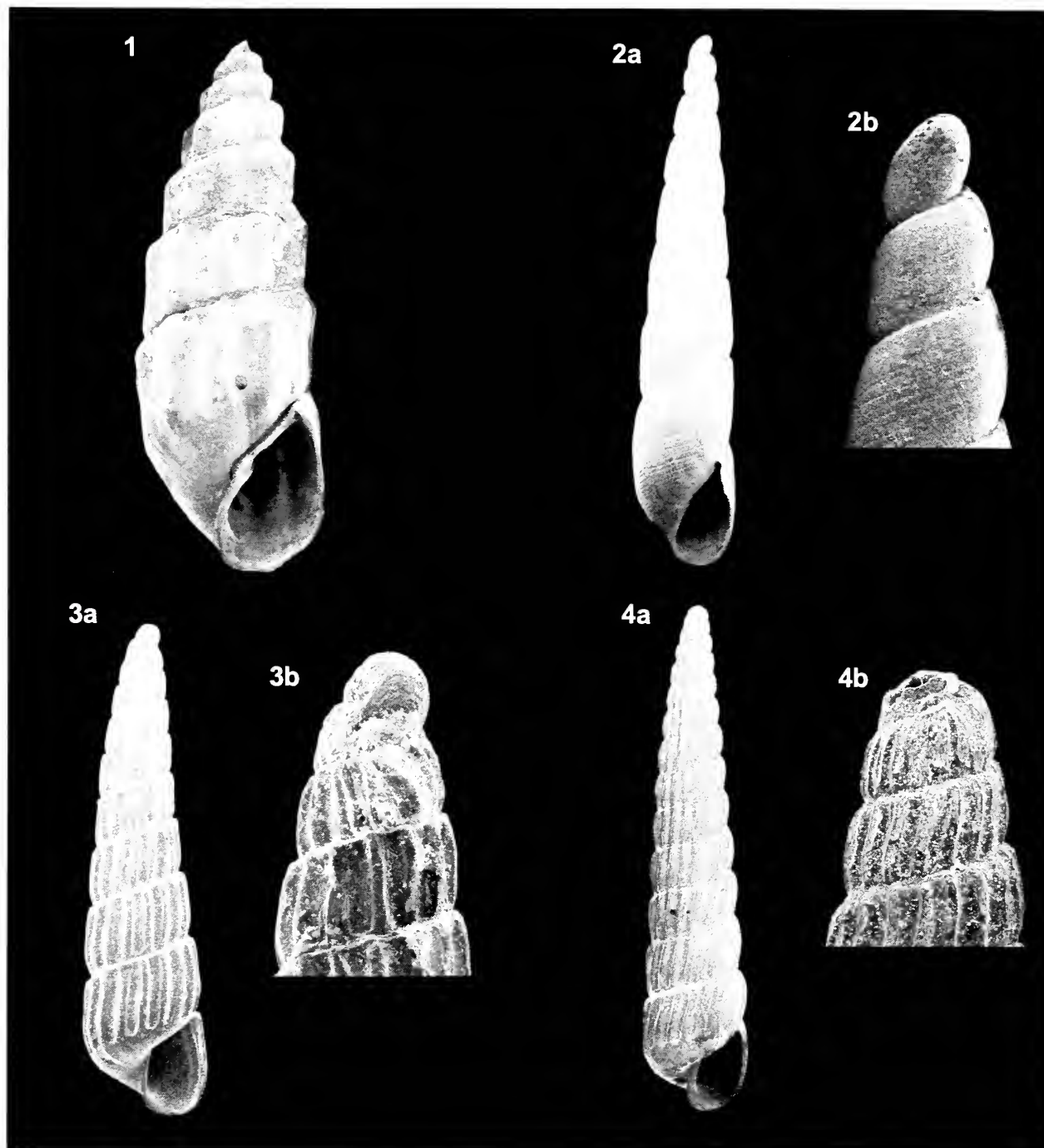


Plate 8, Figure 1 *Salassia juani* (Bartsch, 1917). SBMNH 369660, a) shell height = 4.822 mm. **Figure 2a, b** *Careliopsis hanna* (Strong, 1938). SBMNH 369667, a) shell height = 5.822 mm; b) protoconch image height = 1007 μ m. **Figure 3a, b** *Chemnitzia aculeus* (C. B. Adams, 1852). SBMNH 369673, a) shell height = 3.611 mm; b) protoconch image height = 712 μ m. **Figure 4a, b** *Chemnitzia hypolispa* (Dall & Bartsch, 1909). SBMNH 369688, a) shell height = 7.672 mm; b) protoconch image height = 764 μ m. SEM micrographs by Daniel Geiger, digital editing by Paul Valentich-Scott.

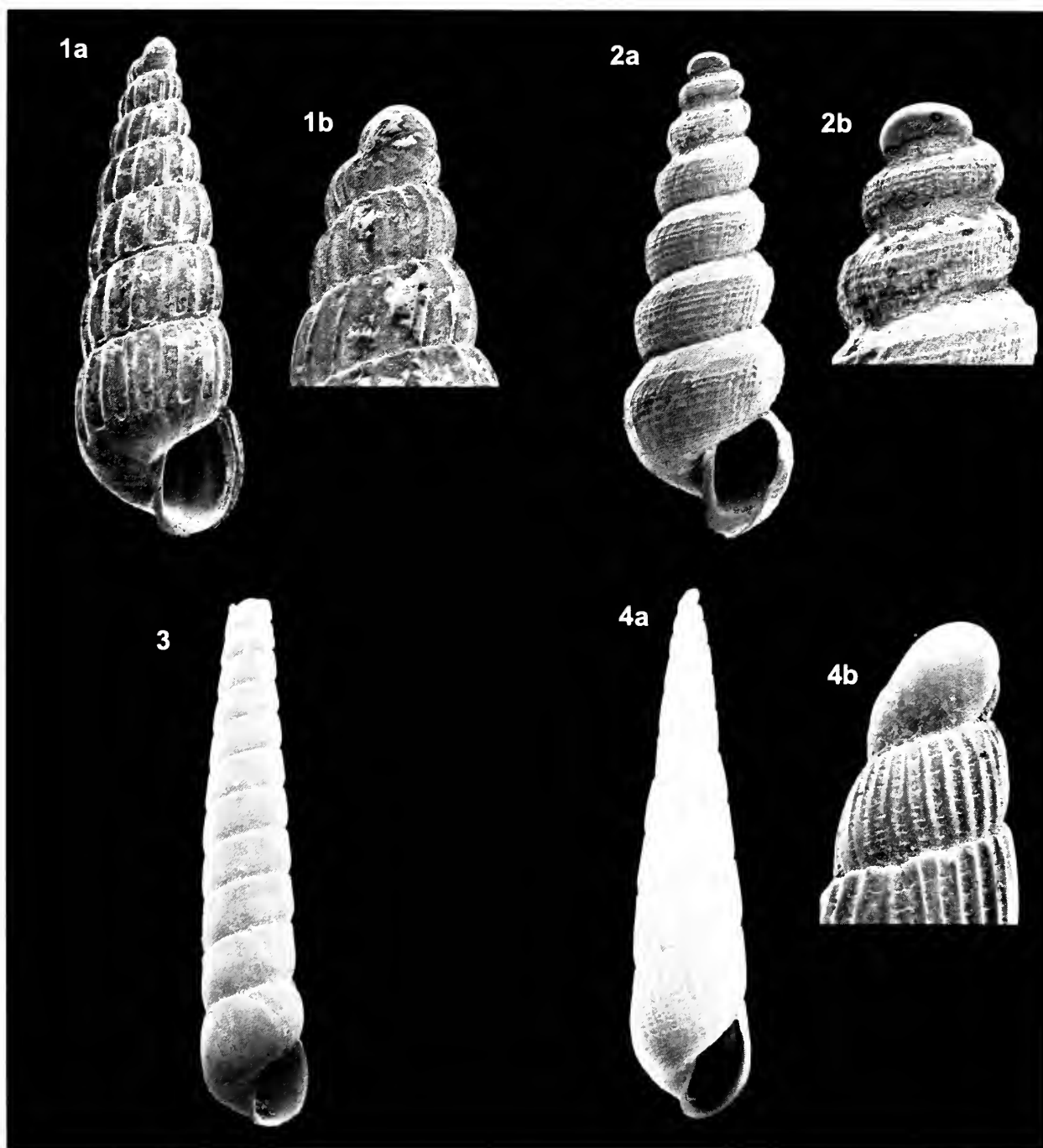


Plate 9, Figure 1a, b *Chemnitzia muricatoides* (Dall & Bartsch, 1909), SBMNH 369653, a) shell height = 2.782 mm; b) protoconch image height = 769 μ m. **Figure 2a, b** *Cingulina evermanni* (Baker, Hanna & Strong, 1928), SBMNH 369682, a) shell height = 1.741 mm; b) protoconch image height = 436 μ m. **Figure 3** *Ptycheulimella penascoensis* (Lowe, 1935), SBMNH 369674, shell height = 7.927 mm. **Figure 4a, b** *Pyrgiscus azteca* (Baker, Hanna & Strong, 1928), SBMNH 369652, a) shell height = 7.771 mm; b) protoconch image height = 748 μ m. SEM micrographs by Daniel Geiger, digital editing by Paul Valentich-Scott.

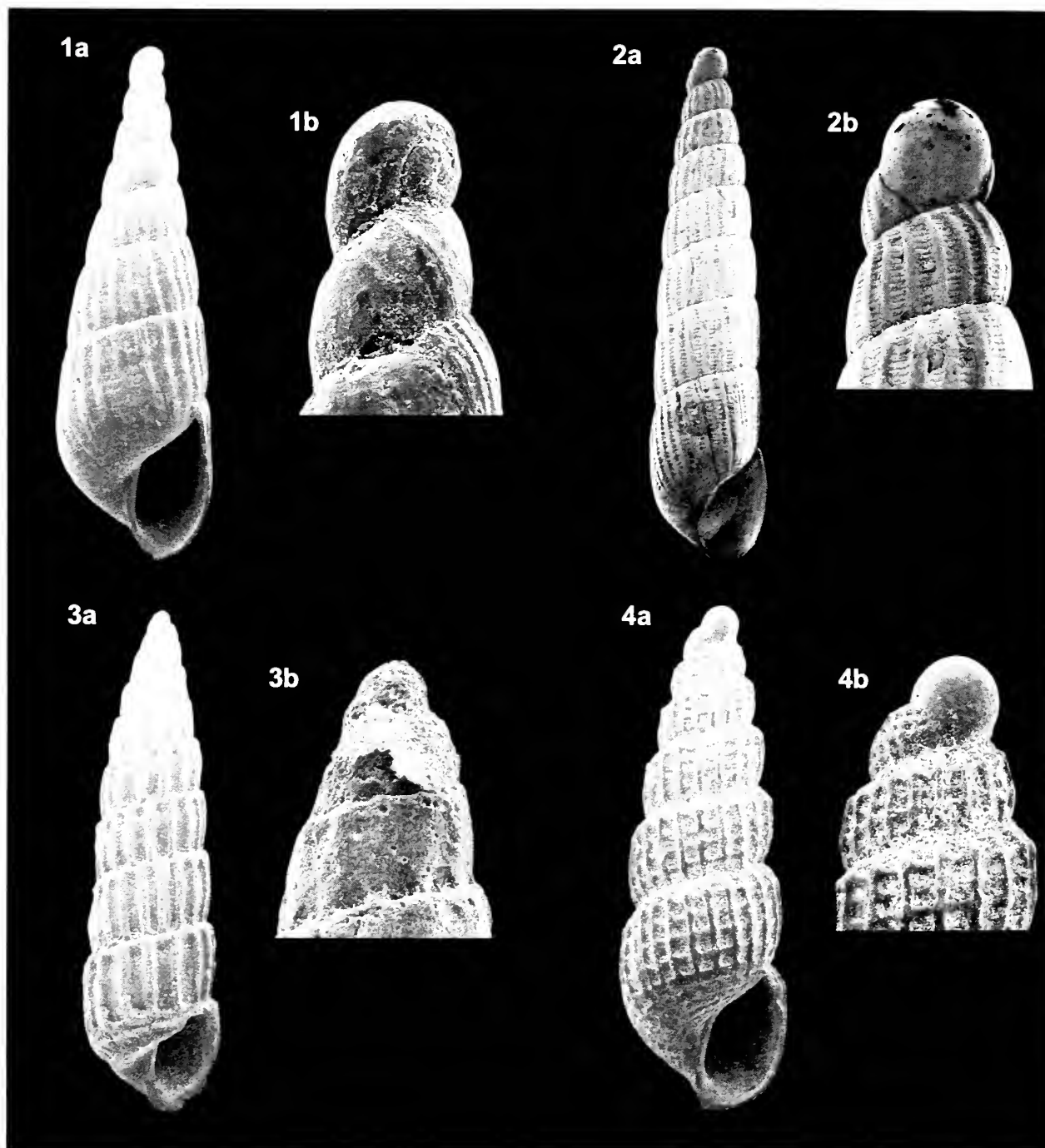


Plate 10, Figure 1a, b *Pyrgiscus ceralva* (Dall & Bartsch, 1909), SBMNH 369659, a) shell height = 3.729 mm; b) protoconch image height = 617 μ m. **Figure 2a, b** *Pyrgiscus mariana* (Bartsch, 1917), SBMNH 369670, a) shell height = 4.147 mm; b) protoconch image height = 771 μ m. **Figure 3a, b** *Turbonilla (Asmundia) turrita* (C. B. Adams, 1852), SBMNH 369665, a) shell height = 3.600 mm; b) protoconch image height = 520 μ m. **Figure 4a, b** *Turbonilla (Bartschella) semela* Bartsch, 1924, SBMNH 369658, a) shell height = 2.992 mm; b) protoconch image height = 715 μ m. SEM micrographs by Daniel Geiger, digital editing by Paul Valentich-Scott.

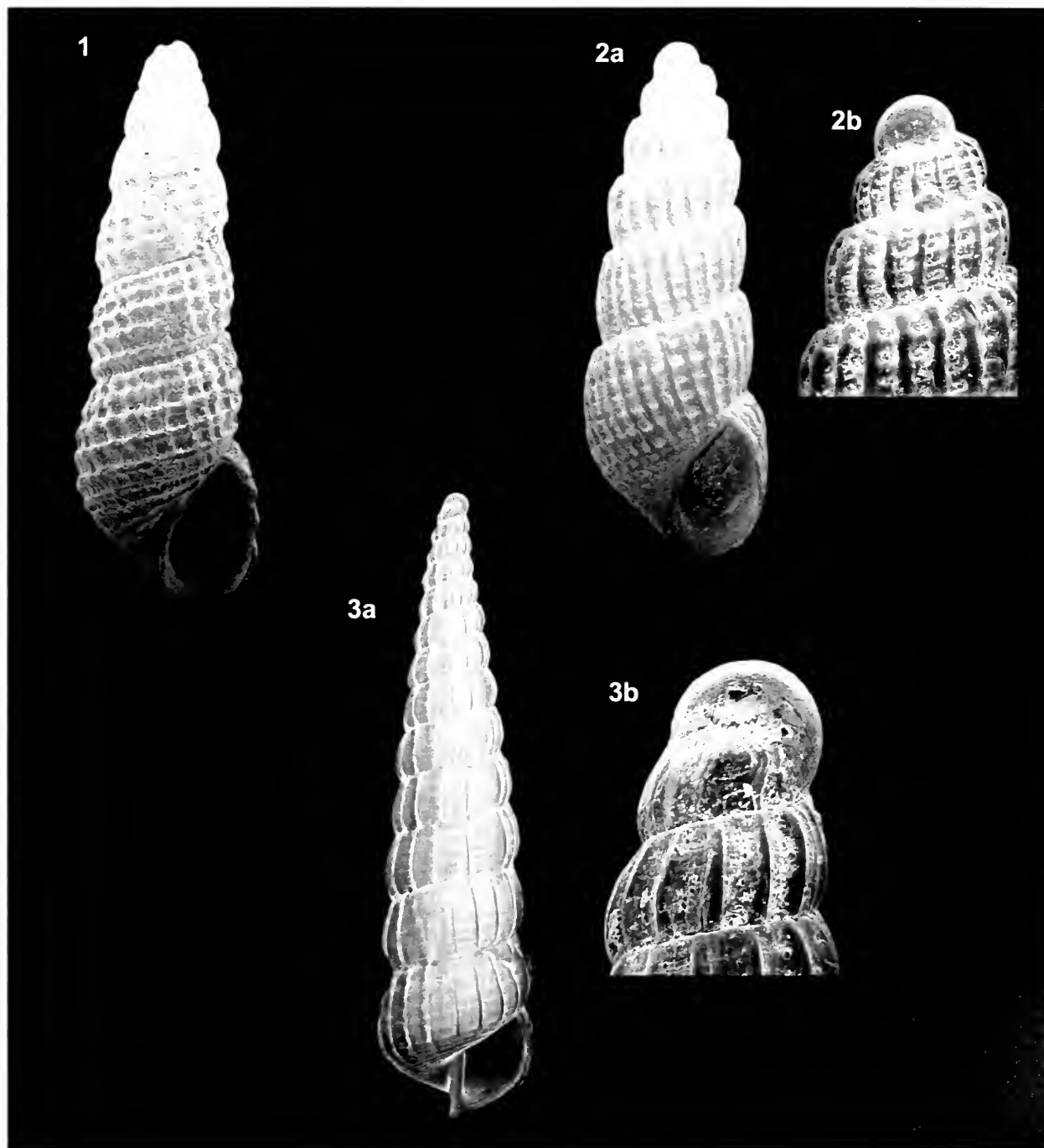


Plate 11, Figure 1 *Turbonilla (Bartschella) vestae* Hertlein & Strong, 1951, SBMNH 369666, a) shell height = 2.956 mm. **Figure 2a, b** *Turbonilla (Dunkeria) andrewsi* Dall & Bartsch, 1909, SBMNH 369683, a) shell height = 2.437 mm; b) protoconch image height = 960 μ m. **Figure 3a, b** *Turbonilla (Mormula) coyotensis* Baker, Hanna & Strong, 1928, SBMNH 369685, a) shell height = 6.957 mm; b) protoconch image height = 694 μ m. SEM micrographs by Daniel Geiger, digital editing by Paul Valentich-Scott.

REMEMBERING BILLEE GERRODETTE (1917 - 2007)

It is with deep sadness that I report the passing of our friend and Charter Member Billee Gerrodette. Billee was our "Delco Bunny." She amazed us all with her energy, spontaneity and joy of life. In her later years, she and husband George traveled, entertained, explored and danced whenever they could. They attended Club meetings and social functions together and Billee was still swimming 20 laps a day in her 80s!

Last May, George surprised Billee with a marvelous party for her 90th birthday at their favorite restaurant (Figure 1). The restaurant was packed with friends who treasured Billee. The high point of the evening for me, and probably for most in attendance, was when Billee and George danced to one of their favorite songs.

Billee was an active member of the San Diego Shell Club since its inception, serving as Vice President (1964, 1977), President (1965), and editor in 1963-Jan 1964 of the San Diego section of the *News of the Western Association of Shell Clubs* (precursor to *The Festivus*). She was also the "phone committee" in those years and it always made me laugh, because Billee was not one for phone calls and so the messages were the shortest, fastest complete calls I'd ever received.

Billee also entertained often at Club parties with her sister Twila, either Island dancing or in synchronized swimming. (Billee and her sister Twila performed professionally as a synchronized swim team in the 1940s and 50s and she and her sister were the first women to be certified scuba divers in the US. (See *The Festivus* 39(7):59-77).

Billee and Twila had traveled and dived in many choice locations throughout the world, some rarely



Figure 1. Billee at the surprise party for her 90th birthday.

visited and still pristine at the time, and both added to their shell collections from the areas they visited. The species *Epitonium billeeaanum* (DuShane & Bratcher, 1965) was named in Billee's honor (Figure 2).

In 2006, Billee was awarded an Honorary Membership (Figure 3) in the San Diego Shell Club for her many

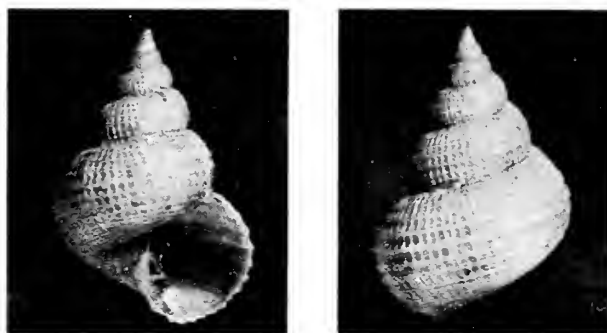


Figure 2. Holotype of *Epitonium billeeaanum* (DuShane & Bratcher, 1965). Printed with the kind permission of *The Veliger* 8(2), plate 24, figures 1 and 2.



Figure 3. Billee receiving her honorary award from Jules Hertz at a meeting of the Club.

years of service and support, an award rarely given.

Billee always said that when the time came she wanted her shells to go where they would be enjoyed by many people and so she donated her entire shell collection to the Club. Her shells along with those of Twila, were the sole items auctioned at two annual Club auctions, raising funds enabling the Club to publish special issues of *The Festivus* and giving members the opportunity to add their special, self-collected shells to their own collections.

Billee was a very special person. We were privileged to be her friends and she leaves a big gap in our lives and the lives of all those who knew her.

[A listing of Billee's published articles follows.]

GERRODETTE, BILLEE [a.k.a. BILLEE DILWORTH and BILLEE BROWN]

- 1963. Nature's remedy – Sea Urchin spines. News of the Western Association of Shell Clubs 4(6):D23 (Nov. 1)
- 1967a. Catching up [on the Olivella Dive project of the Club]. News of the Western Association of Shell Clubs 8(2): D1 (March 1).
- 1967b. Olivella Dive. News of the Western Association of Shell Clubs 8(5): D15 (Sept. 1).
- 1972. Samoan hideaway. The Festivus 3(10): 2-3.
- 1974a. Scammons lagoon. The Festivus 5(6): 117 [misdated as issue 7].
- 1974b. Shells by the touch system. The Festivus 5(10): 150.
- 1976a. Hawaiian shelling. The Festivus 7(3): 14-15.
- 1976b. Diving in the San Juan Islands. The Festivus 7(11): 60.
- 1977a. Symbiotic relationship? The Festivus 8(8): 56. 2 figs. [*Megathura crenulata* and *Opisthopus transversus*].
- 1977b. Collector tips. The Festivus 9(10): 73.
- 1978. Our hats off to Dave Dwyer. The Festivus 10(6): 43.
- 1983. A near calamity. 15(8): 88.
- 1985. American Malacologists Union - fifty-first annual meeting. The Festivus 17(9): 94.

Carole M. Hertz, editor

LOW TIDES FOR 2008 AT SAN FELIPE, BAJA CALIFORNIA, MÉXICO

The entries below show periods of low tides of -3.90 feet and below. The times of low tides are given in Pacific Standard Time, except those dates marked with an asterisk are in Pacific Daylight Time. To correct for

Puerto Peñasco add one hour to listed times when they are in Pacific Standard Time. Tides below the midriff of the Gulf cannot be estimated using these entries. All entries are approximate times and tides.

Jan. 22	8:33 p.m.	-4.52 ft	May 6	9:31 a.m. *	-5.08 ft	Oct. 13 *	8:17 p.m.	-3.90 ft
Jan. 23	9:08 p.m.	-3.97 ft	May 7	10:14 a.m. *	-4.18 ft	Oct. 14 *	8:48 p.m.	-4.71 ft
Feb. 2	8:40 p.m.	-4.16 ft	Jun. 2	7:54 a.m. *	-4.35 ft	Oct. 15 *	9:21 p.m.	-4.88 ft
Feb. 19	7:47 p.m.	-3.96 ft	Jun. 3	8:38 a.m. *	-4.94 ft	Oct. 16 *	9:56 p.m.	-4.33 ft
Feb. 20	8:19 p.m.	-4.07 ft	Jun. 4	9:24 a.m. *	-4.88 ft	Nov. 11	6:49 p.m.	-4.31 ft
Mar. 6	7:49 p.m.	-4.13 ft	Jun. 5	10:09 a.m. *	-4.18 ft	Nov. 12	7:26 p.m.	-5.13 ft
Mar. 7	8:22 p.m.	-4.41 ft	Jul. 2	8:34 a.m. *	-4.55 ft	Nov. 13	8:05 p.m.	-5.26 ft
Mar. 8	8:55 p.m.	-3.94 ft	Jul. 3	9:20 a.m. *	-4.80 ft	Nov. 14	8:47 p.m.	-4.68 ft
Mar. 9	9:13 a.m.	-3.93 ft	Jul. 4	10:04 a.m. *	-4.39 ft	Dec. 10	6:31 p.m.	-3.92 ft
Apr. 5	7:42 a.m.	-4.23 ft	Jul. 31	8:32 a.m. *	-4.37 ft	Dec. 11	7:16 p.m.	-4.91 ft
Apr. 6	9:14 a.m. *	-4.94 ft	Aug. 1	9:13 a.m. *	-4.76 ft	Dec. 12	8:01 p.m.	-5.30 ft
Apr. 7	9:48 a.m. *	-4.91 ft	Aug. 2	9:50 a.m. *	-4.42 ft	Dec. 13	8:46 p.m.	-5.00 ft
Apr. 8	10:25 a.m. *	-4.13 ft	Aug. 29	8:22 a.m. *	-3.99 ft	Dec. 14	9:32 p.m.	-4.03 ft
May 4	8:14 a.m. *	-4.67 ft	Aug. 30	8:57 a.m. *	-4.24 ft			

The Festivus.
American Museum of Natural
History
Received on: 03-10-08



THE FESTIVUS

A publication of the San Diego Shell Club

ISSN 0738-9388

Volume: XL

February 14, 2008

Number: 2

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c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111, USA.

The Festivus is published monthly except December. The publication date appears on the masthead above. Single copies of this issue: \$5.00 plus postage.

Meeting date: third Thursday, 7:30 PM,
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PROGRAM

Some Personal Perspectives of Arctic Marine Ecosystems

Paul Dayton, Professor of Oceanography at Scripps Institution of Oceanography who last year spoke on the Antarctic, will now take us to the Arctic from its prehistory to gray whales in a warming climate.

Meeting date: February 21, 2008

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CLUB NEWS

San Diego Shell Club Meeting January 17, 2007

The meeting was called to order by John LaGrange at 7:40 pm. The minutes of the previous meeting were accepted as published in *The Festivus*. There was no treasurer's report. John discussed the Mission Bay study, and Paul Tuskes brought some additional clip boards and data sheets for recording observations. John proposed the next field trip for Monday the 21st of January, at South Cove on Vacation Island. Those interested should meet at 1:30 pm, an hour prior to the minus tide.

Hans Bertsch briefly discussed the impact that a teacher who just passed away had on his life and interest in biology. I think a number of us could relate to the qualities that Hans talked about. Hans also had copies of his book *Sea of Cortez Marine Invertebrates* available at the meeting.

John LaGrange introduced the speaker, Paul Tuskes, who discussed the shallow water habitats (less than 40 ft) and snails associated with them in Hawaii. The emphasis was on cowries, cones and rock shells, but other groups were included. In addition, the Hawaiian regulations related to collecting were reviewed. Underwater photos of live shells helped to illustrate their appearance and preferred habitats. Dozens of species can occur in very shallow water and visiting tide pools with a mask and snorkel can be productive. The book *Hawaiian Sea Shells* by Mike Severns was recommended as the shells are illustrated in color and data and habitat are often mentioned.

The meeting was adjourned at 8:50 pm. After the meeting many people stayed around to discuss their favorite locations in Hawaii and enjoy the refreshments provided by John LaGrange. The door prize was won by Paul Tuskes.

Paul Tuskes

Wes Farmer Becomes an Honorary Member

At the recent Club Christmas Dinner Party, Wes Farmer was awarded an honorary membership in the Club for his many years of service. He has long been a naturalist and as a member of the Club has served as president and twice as vice-president. He continues to be our Botanical Society rep. – and has hosted the Club's annual Auction/Potluck for the past 20 years.

Mark your Calendars and Save the Date

The Annual San Diego Shell Club Auction/Potluck will be held on Saturday April 26th and once again it will be at the Club House of Wes Farmer's condo.

Sorting and bagging have already begun for this annual event and it is obvious that there will be some exciting shells on auction that evening. In addition to some fine books such as the boxed two-volume set of *Australian Marine Shells* by Barry Wilson, we have already set aside some fantastic shells. To name just a few, we note the cowries – *Cypraea aequinoctialis*, *ostergaardi*, and *nigropunctatus* (Galápagos); the strombs – *Strombus taurus* and *helli*, the trophons – *Boreotrophon bentleyi*, *Trophon carduus*, *geversianus*, and *beebei*; the cones – *Conus lucidus* (Galápagos), *orion*, *bartschi* and *dalli*; unusual white *Oliva spicata* and gold *O. incrassata* plus a magnificent *Trigonostoma milleri*. And there is much sorting yet to be done!

The auction/potluck is our biggest social event of the year and the funds raised support publication of *The Festivus*, our donations to scientific organizations, support of the San Diego Science and Engineering Fair and Club expenses which are not covered by our very reasonable annual dues.

The Club would certainly welcome donations to this auction from members and friends. Our wish is for special specimen shells with data or books and related shell items. But our biggest wish is that you save the date and attend!!

The Mission Bay Survey Project

Another low tide is coming up on February 18th – a minus 1.4 ft at 1:59 pm. This falls on Presidents' Day weekend so, hopefully, this will make it easier for more members and friends to attend the Survey.

The plan is to meet at 1:00 pm to catch the outgoing tide. We will be meeting at Santa Clara Cove-Sail Bay at the east side of the parking lot between the Mission Bay Aquatic Center and the Santa Clara rec. center. It's mostly sand with eel grass, but there is an area of gravel and cobbles. It's not too mucky.

Directions: Mission Blvd. to Santa Clara place, go all the way to the east side of the parking area 1.

For any further questions, call John La Grange at 858-755-7215 or Paul Tuskes at 858-274-5829.

THE OPISTHOBRANCH FAUNA OF THE ARCHIPIÉLAGO DE REVILLAGIGEDO, MEXICAN PACIFIC

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Keywords – Mollusca, Opisthobranchia, México, Oceanic Islands, Islas Revillagigedo, Isla Socorro, Isla San Benedicto, Isla Clarión, Roca Partida

Abstract

This paper reports 37 additional species of opisthobranchs from the Islas Revillagigedo. Only five species were known previously. The vast majority of these species are known from elsewhere in the Panamic region, and many are not only found in the Panamic, but are also known to be more widespread. Two species, *Runcina* sp. and *Chromodoris* sp., are undescribed and are not known from localities outside of the archipelago.

Resumen

El presente artículo reporta 37 especies de opistobranquios para el Archipiélago de Revillagigedo. Únicamente cinco especies se conocían anteriormente para estas islas. La gran mayoría de estas especies son conocidas en otras áreas de la región Pan mica, y muchos de ellos no solamente se han reportado como fauna Pan mica, sino que se distribuyen ampliamente. Dos especies, *Runcina* sp. y *Chromodoris* sp. son especies no descritas y no se han encontrado en otras localidades fuera del archipiélago.

Palabras clave – Mollusca, Opisthobranchia, México, Islas oce nicas, Islas Revillagigedo, Socorro, San Benedicto, Clarión, Roca Partida

Introduction

Islas Revillagigedo is an archipelago consisting of four islands in the eastern Pacific Ocean located at approximately 18°N latitude 112°W longitude. Volcanic in nature, the archipelago stands isolated in the Pacific some 386 km southwest of Cabo San Lucas off the southern tip of Baja California Sur. Even though at a greater distance (720 and 970 km) from Manzanillo, they are politically part of this latter municipality in the state of Colima, México (Figure 1).



Figure 1. Map showing México and the islands.

The Islands are uninhabited except for a naval station of 50 service personnel on the south end of Isla Socorro and there are another nine servicemen stationed on Isla Clarión. The Islas Revillagigedo are primarily influenced by the western flow of the temperate California Current as it picks up warmer water and swings off the Mexican coast to become the South Equatorial Current (Zinsmeister & Emerson, 1979; Bernard et al., 1991), also by extensions of the North Equatorial Counter Current from the southeast (Finet, 1991).

History

No evidence of human habitation on the Islas Revillagigedo existed before their discovery in 1533 by the Spanish explorer Hernando de Grijalva. The Islands are named after Don Juan Vicente de Güemes Padilla Horcasitas y Aguayo, 2nd Count of Revillagigedo, the 53rd viceroy of New Spain. They have been visited by a number of explorers: Domingo del Castillo (1541), Miguel Pinto (1772), Alexander von Humboldt (1811), Benjamín Norell (1825), Sir Edward Belcher (1839) who made the first botanical collections, and Reeve (1848) who witnessed the eruption of Mount Evermann on Isla Socorro. In 1865, ornithologist Andrew Jackson Grayson discovered the Socorro Dove *Zenaida graysoni* which is now extinct in the wild and the Socorro Elf Owl *Micrathene whitneyi graysoni*.

At the beginning of the twentieth century, Dr. Barton Warren Evermann, Director of the California Academy of Sciences, San Francisco, promoted the scientific exploration of the Islands. The most comprehensive biological collections were made at this time and the volcano on Isla Socorro was renamed in his honor. Because of their ecological importance and numerous endemic species of plants and land and marine animals, the Mexican government established the Islands as a Biosphere Reserve on June 4, 1994, and the archipelago is now monitored by CONANP (Comisión Nacional de Áreas Naturales Protegidas), the council for natural protected areas. Currently, the permitted activities in the islands and the surrounding waters are SCUBA-diving, snorkeling and sightseeing. Fishing is not allowed in any form.

Isla Socorro (Figure 2)

Largest in size with an area of 132.06 km² (Levin & Moran, 1989) and a maximum altitude of 1,130 meters at Mount Evermann (Wehtke et al., 1978), the island is basically a large volcano with secondary cones, domes and lava flows which reach the coast. The last

eruption occurred in 1848 (Medina, 1978). The climate is generally dry with rain during the hurricane season, July through October (Troyo et al., 1992). The east side of the island is unapproachable because of its exposed coast consisting of many precipitous crags. The west side has several different sized bays which are more accessible.

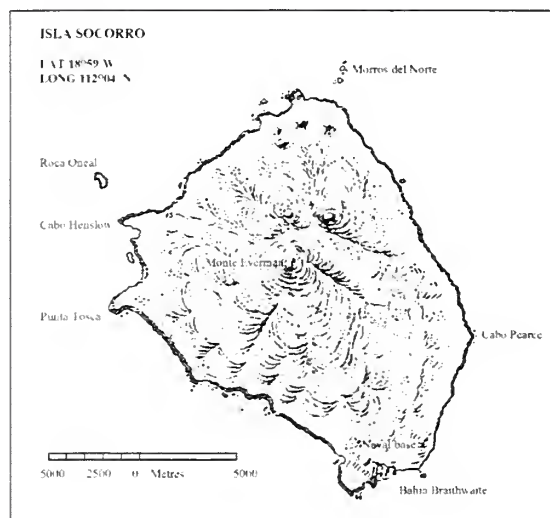


Figure 2. Isla Socorro.

Isla Clarión (Figure 3)

Clarión is considered México's last frontier for being the westernmost island of the archipelago. Sit-

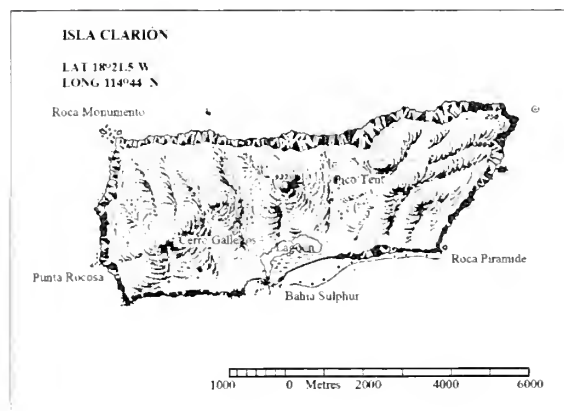


Figure 3. Isla Clarión.

uated about 335 km WSW of Socorro, it is the oldest and second in size of the group. It is volcanic in origin with a maximum longitude of 8.5 km east to west and 3.7 km north to south. The northern part of the island has cliffs and rocks that are distinct landmarks for the island and is characterized by three prominent volcanic peaks, all of which exceed 284 m in elevation. The shore is rocky with precipitous sea cliffs and the few exposed sandy beaches are largely limited to Bahía Sulphur in the south. A well-developed coral reef is present on the south side of the island, including reefs in Bahía Sulphur (Hanna, 1926; Lewis & Ebeling, 1974).

Isla San Benedicto (Figure 4)

Thirty two nautical miles from Socorro, San Benedicto is 4.3 km long and 2.5 km wide. The eruption in 1954 of the volcano Barcena caused the entire island to be covered in volcanic ash and is a very

distinct feature of the island. Its summit rises 310 meters above sea level and is deprived of vegetation on its surface of solidified rivers of lava.

Roca Partida (Figure 5)

Roca Partida is more accurately described as an islet than an island. A small rock, with a height of 40 m and length of 90 m, and what is left of a now underwater volcano. It rises 43 m above the sea level from a plateau with depths of more than 80 m. The visible rock is the lava plug that remains from a long-extinguished and eroded volcano.

Roca Partida is a place of strong currents and surge and is known for its rich fish population. However, its high energy nature at diving depths does not allow for growth of encrusting animals such as bryozoans, hydroids and gorgonians. Such animals are observed well below the depth of 80 meters, where it is not practical to conduct effective surveys utilizing conventional SCUBA equipment and techniques.

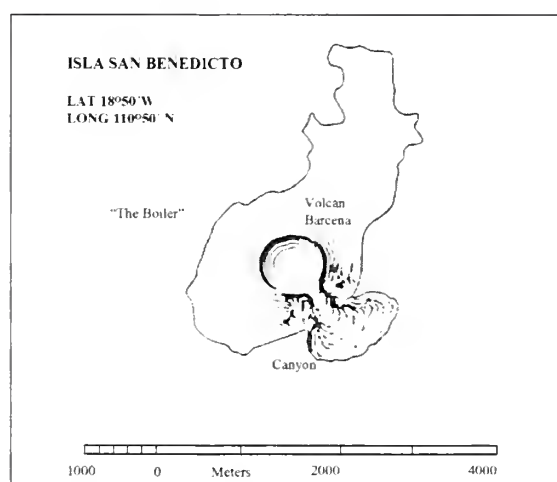


Figure 4. Isla San Benedicto.

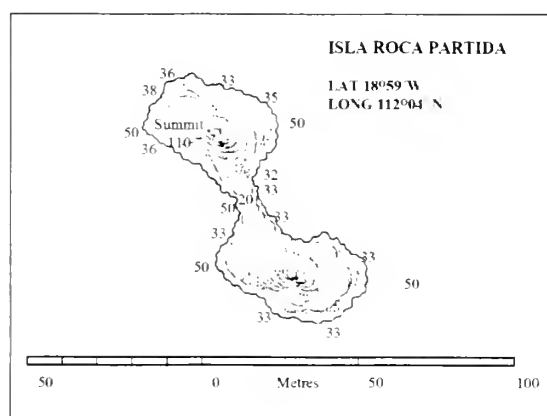


Figure 5. Roca Partida.

Table 1. Geographical information

Island	Length by width (km)	Area (km ²)	Highest peak (m)
San Benedicto	4.3 by 2.5	5.94	Barcena (310)
Socorro	16.8 by 15.6	132.06	Evermann (1130)
Roca Partida	0.24 by .07	0.014	43
Clarión	8.5 by 3.7	19.80	Monte Gallegos (335)

Previous research of the molluscan fauna of Islas Revillagigedo

Publications on the mollusks of Islas Revillagigedo are numerous: Strong & Hanna (1930), Villalobos (1960), Ferreira (1983), González-Nakagawa & Sánchez-Nava (1986), Chávez-Hernández & Bretado-Aguirre (1990), Holguín Quiñones (1992), Emerson (1995), Reyes-Bonilla (1999). Strong & Hanna (1930) published a list of benthic species for Clarión that includes a total of 43 mollusks with mostly Panamic faunal affinities. Emerson (1967) describes this same affinities for Isla Socorro.

The most comprehensive list for the molluscan fauna of the Islas Revillagigedo was published by Emerson (1995) with 175 taxa of shelled mollusks (42 bivalves, 125 gastropods and 8 polyplacophorans). Emerson was the first author to include species of opisthobranch mollusks in his study based on conchological material: *Bulla punctulata* A. Adams in Sowerby, 1850, and *Tylodina fungina* Gabb, 1875. Reyes-Bonilla (1999) annotated this list, adding *Aplysia californica* Pilsbry & Lowe, 1932; *Oxynoe panamensis* Pilsbry & Olsson, 1943, and *Glossodoris sedna* (Marcus & Marcus, 1967 [as *Chromodoris sedna* (Marcus & Marcus, 1967)]). The latter is also the latest publication of mollusks and contains a total of 222 species; 48 bivalves, 164 gastropods and 10 chitons. The composition is 90% Panamic Province with 75% for gastropods only.

Materials and Methods

Surveys were conducted with SCUBA in the daytime, using the direct observation method. Four night dives were done at Socorro and one at San Benedicto. A hand-held blue dive light (NightSea) was used during one night dive at Socorro to aid in the search for some of the cryptic species that exhibit fluorescence. At Roca Partida, the indirect method (scrape potential prey or habitats, such as sponges, hydroids, bryozoans or algae and look for opisthobranchs in containers on the surface) was also used.

During a period of 19 years, a total of 44 days were spent searching for the species reported herein. Animals were observed, photographed and/or collected by the authors during various expeditions to the Islands: December 1988 (5 days); October 2000 (3 days); November 2004 (2 days); 2005, January (6 days); March (8 days), April (6 days) and November (5 days); 2007 March (6 days) and April (3 days).

The areas visited at Isla Socorro were around Cabo Pearce, Punta Tosca, Bahía Braithwaite (where the naval base is located) and Cabo Henslow. All are located in the southwest and southeast of the lower half of the island. In San Benedicto only two areas were visited: the canyon near the lava flow and the seamount commonly known as "The Boiler." At Isla Clarión a few spots at Bahía Sulphur (south, central), the northwest rocks and seamounts on the west side of the island; no sites to the north or east were surveyed because of inclement weather conditions. At Roca Partida, the area that is within SCUBA diving depths (0-30 meters) is subject to great surge and currents. The habitats on the rock faces at these depths are not suitable for opisthobranchs. Only one deep dive (85 meters) was conducted implementing a closed circuit rebreather and the indirect method of survey was used.

Voucher specimens of some species were preserved and have been deposited in the California Academy of Sciences, Invertebrate Zoology and Geology Collections (CASIZ) in San Francisco and at the Natural History Museum of Los Angeles County (LACM).

Results and Discussion

A total of 37 species of opisthobranch mollusks are here documented, which extends the number of known taxa for the Archipelago to 42. Table 2 lists the species found at each of the Islands in the Archipiélago de Revillagigedo along with their geographic affinities.

Islas Revillagigedo (latitude 18°N), constitutes the southernmost range reported for *Paradoris lopezi*, *Aldisa sanguinea*, *Navanax inermis* and *Cuthona longi*.

Some undescribed species that have been reported from the western American coastal areas have been found at the oceanic islands of Revillagigedo. This additional information for species in the process of being described, contributes to our knowledge of: *Polycera* sp., *Cadlina* sp., *Elysia* sp.

Berthellina ilisima, is one of the most abundant opisthobranchs found on the west coast of México (Hermosillo & Behrens, 2004) to Panamá, including Isla Coiba (Hermosillo, 2004). It has also been recorded from the other four of the oceanic island groups: Islas Galápagos (Gosliner, 1991); Clipperton (Kaiser, 2007), Isla de Malpelo (Kaiser & Bryce, 2001) and Isla del Coco. Oddly, it has not been found in the Revillagigedos. Nonetheless, other pleurobranchids such as *Berthella agassizii*, *B. martensi* and *B. stellata*, as well as *Pleurobranchus aerolatus*, were observed frequently in

Table 2. Taxonomic Composition of the Opisthobranch Mollusks of Islas Revillagigedo.

Genus/Species	Islands where observed	Geographic affinities
CEPHALASPIDEA		
AGLAJIDAE		
<i>Navanax aenigmaticus</i> (Bergh, 1894)	San Benedicto and Socorro	Tropical Atlantic and Panamic
<i>Navanax inermis</i> (Cooper, 1863)	San Benedicto	Temperate-Panamic
<i>Bulla punctulata</i> A.Adams in Sowerby, 1850	Not specified	Temperate-Panamic
<i>Runcina</i> sp. 1	Socorro	So far, only found in the archipelago and little is known of this species
ANASPIDEA		
APLYSIIDAE		
<i>Aplysia californica</i> Pilsbry & Lowe, 1932	Socorro	Temperate-Panamic
<i>Aplysia parvula</i> Mörch, 1863	Socorro	Panamic (circumtropical)
<i>Aplysia cedrosensis</i> Bartsch & Rehder, 1939	Socorro	Panamic
<i>Stylocheilus striatus</i> (Quoy & Gaimard, 1894)	Socorro	Panamic (circumtropical)
<i>Dolabella auricularia</i> Lightfoot, 1786	San Benedicto and Socorro	Panamic and Indo-Pacific
PLEUROBRANCHIA		
TYLODINIDAE		
<i>Tyrodina fungina</i> (Gabb, 1865)	San Benedicto and Socorro	Temperate-Panamic
PLEUROBRANCHIDAE		
<i>Berthella agassizii</i> (MacFarland, 1909)	Socorro	Temperate-Panamic and western Atlantic
<i>Berthella martensi</i> (Pilsbry, 1896)	Socorro	Panamic and Indo-Pacific
<i>Berthella stellata</i> (Risso, 1862)	Socorro	Panamic (circumtropical)
<i>Pleurobranchus areolatus</i> (Möorch, 1863)	San Benedicto and Socorro	Panamic and western Atlantic
SACOGLOSSA		
OXYNOIDAE		
<i>Lobiger souverbii</i> Fischer, 1856	Socorro	Panamic (circumtropical)
<i>Oxynoe panamensis</i> Pilsbry & Olsson, 1943	Socorro	Panamic
POLYBRANCHIIDAE		
<i>Placida dendritica</i> (Alder & Hancock, 1843)	Socorro	Panamic (cosmopolitan)
<i>Polybranchia viridis</i> (Deshayes, 1857)	Socorro	Temperate-Panamic and eastern Atlantic
PLACOBANCHIDAE		
<i>Elysia</i> cf. <i>timida</i> Risso, 1818	Socorro, Clarión	Panamic also eastern and western Atlantic (LACM 173794)
<i>Elysia diomedea</i> (Bergh, 1894)	Socorro	Panamic
<i>Elysia</i> sp.	San Benedicto	Panamic, as <i>Elysia</i> sp. 2 in Camacho-García et al. (2005)
NUDIBRANCHIA		
GONIODORIDIDAE		
<i>Okenia cochimi</i> Gosliner & Bertsch, 2004 (Figure 5)	San Benedicto	Panamic
POLYCERIDAE		
<i>Polycera</i> sp. 1	Socorro	Panamic, as <i>Polycera</i> sp. in Camacho-García et al. (2005)
DORIDIDAE		
<i>Discodoris ketos</i> (Er. & Ev. Marcus, 1967)	Socorro, Clarión, San Benedicto	Panamic

<i>Jorunna</i> sp.	Socorro	Panamic as <i>Jorunna</i> sp. 1 in Behrens & Hermosillo, 2005
<i>Aldisa sanguinea</i> (Cooper, 1863) (Figure 8)	San Benedicto	Temperate-Panamic
<i>Paradoris lopezi</i> (Hermosillo & Valdés, 2004) (Figure 7)	Socorro	Panamic
CHROMODORIDAE		
<i>Cadlina</i> sp.	San Benedicto, Socorro.	Panamic, as <i>Cadlina</i> sp. in Camacho-García et al., 2005, LACM 173798, 173796
<i>Glossodoris dalli</i> (Bergh, 1879)	San Benedicto	Panamic
<i>Glossodoris sedna</i> (Er. & Ev. Marcus, 1967) (Figure 6)	San Benedicto, Socorro	Panamic also western Atlantic
<i>Chromodoris</i> sp.	San Benedicto, Socorro	So far only known for the archipelago, as <i>Chromodoris</i> sp. in Hermosillo et al. (2006), CASIZ
DENDRODORIDIDAE		
<i>Dendrodoris fumata</i> (Rüppell & Leuckart, 1830)	Socorro, Clarión	Panamic, Indo-Pacific LACM 173795
AEOLIDINA		
FLABELLINIDAE		
<i>Flabellina marcorum</i> Gosliner & Kuzirian, 1985	San Benedicto, Socorro	Panamic and western Atlantic
<i>Flabellina telja</i> Marcus & Marcus, 1967	Socorro	Panamic
AEOLIDIIDAE		
<i>Antaeolidiella indica</i> (Bergh, 1888) (Figure 11)	San Benedicto, Socorro	Panamic (circumtropical)
<i>Baeolidia nodosa</i> (Haefelfinger & Stamm, 1985)	Socorro	Panamic (circumtropical)
FACELINIDAE		
<i>Facelinidae</i> sp.	Socorro	Panamic, as <i>Facelina</i> sp. 2 in Hermosillo & Behrens (2005)
<i>Noumeaella rubrofasciata</i> Gosliner, 1991	Socorro	Temperate-Panamic
<i>Phidiana lasrucensis</i> Bertsch & Ferreira, 1974	San Benedicto, Socorro	Panamic
TERGIPEDIDAE		
<i>Cuthona longi</i> Behrens, 1985 (Figure 9)	Roca Partida	Panamic, LACM 173793
<i>Cuthona millenae</i> Hermosillo & Valdes, 2007	Clarión, Socorro	Panamic.
<i>Phestilla lugubris</i> (Bergh, 1870)	Socorro	Panamic, Indo-Pacific LACM 173797

the Revillagigedos.

The analysis of the biogeographic affinity of the opisthobranch fauna of Islas Revillagigedo is mainly Panamic. There are only two possibly endemic species of opisthobranchs, *Chromodoris* sp. and *Runcina* sp. (5%). The other 40 species have a Panamic affinity, with 17 species being Panamic (40%); seven species Temperate-Panamic (17%); seven species Panamic-Circumtropical (17%); four species Panamic/Indo-Pacific (10%); four Panamic and western Atlantic (10%) and Panamic and eastern Atlantic (2%). This dominant Panamic affinity is consistent with reports of low en-

demism for the Archipiélago de Revillagigedo when compared with other oceanic islands of the tropical eastern Pacific, like Islas Galapagos or Clipperton, sites where endemic species constitute between 17% and 35% of the total fauna, (Glynn et al., 1996; Kaiser, 1997, 2007; Ketchum & Reyes-Bonilla, 1997; Wellington, 1997). This phenomenon is likely the result of a relative lack of isolation of the populations of marine fauna found in the Revillagigedos and the mainland.

The archipelago is under the influence of the California and North Equatorial currents several months of each year (Bernard et al., 1991). It is feasible that

these water masses frequently transport both larvae and adults on floating objects to the island from the west American coastline. Moreover, the trip may take less than a month considering average speeds of 0.2 knots around the islands (Lluch Cota et al. 1994). This is time enough to assure survival for many taxa (Scheltema, 1991; Ketchum & Reyes-Bonilla, 1997).

Expeditions were undertaken on commercial SCUBA diving vessels, which limited substantially the dive sites visited. The researchers were prevented from visiting various habitat types, particularly sand-muddy bottoms with algae coverage, coral rubble, shallow shore areas with boulders and small turnable rocks, where some species are expected to be found. Such sites are not preferred by sport divers doing underwater photography. Night diving was limited by weather, travel schedule and presence of sharks; more nocturnal species might be found if more time could be spent underwater at night, both with regular lights and with fluoroscopic lighting systems. Even though more species could be found with a more comprehensive survey of the Islands, the overall diversity found is remarkably low compared to other Panamic Province islands closer to the mainland or mainland areas. To mention a few, similar survey efforts have yielded more than 85 opisthobranch species for Islas Marietas and more than 100 species for Los Arcos, both in Bahía de Banderas, Jalisco, México (Hermosillo-González, 2006); 70 species for Isla Isabel, Nayarit, México (pers. obs. 2003); 82 species for Parque Nacional de Coiba, Panamá (Hermosillo & Camacho, 2006); 68 species for Islas Murciélago, Costa Rica (pers. obs., 2005) and 67 for Islas Galapagos, Ecuador (Gosliner, 1991; Camacho-García et al., 2005).

Conclusion

So far 16 species have been observed in San Benedicto where most of the underwater observations were conducted at only two popular dive sites for sport divers and tourists. For the larger island of the archipelago, Socorro, a total of 34 species were found, which corresponds to the more diverse habitats surveyed. The faunal composition herein reported for Clarión (only four species) does not represent the potential diversity of the island; further work is needed to have a more accurate representation of the opisthobranch fauna.

One species of opisthobranch, the aeolid nudibranch *Cuthona longi*, is reported from Roca Partida, thanks to the deep indirect collections and images by Jeff Bozanic from the plateau area off Roca Partida. It is presumed

that more species would be found if it were practical to conduct surveys in these deeper depths. Photographs of this substrate at 85 meters show rocky-sand with important potential food sources of gorgonians, hydroids, bryozoans, sponges and algae that would be suitable for a number of opisthobranch species. At these depths, however, and considering the remoteness of the island, conducting serious surveys by diving would be extremely dangerous. More species could also be found in the future using other techniques such as a benthic grab or deep dredging; nonetheless, these are not as effective as the direct survey method or mixed gas diving by well trained scientific divers.

Acknowledgments

This work would have not been possible without the invaluable support and enthusiastic help of Kirstie L. Kaiser, Roberto Ch vez Arce and Pedro Medina Rosas. Our thanks to the M/V *Nautilus Explorer* and Captain Mike Lever. We appreciate the assistance and critical comments of Angel Valdés, Dave Behrens and Sandra Millen.

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Figures 6-11. (6) *Glossodoris sedna* (Er. & Ev. Marcus, 1967), 16 mm L, Isla Socorro, 11 m depth, photographed under fluorescent filters (7) *Paradoris lopezi* (Hermosillo & Valdés, 2004), 23 mm L, Isla Socorro, 6 m depth (8) *Aldisa sanguinea* (Cooper, 1863), 18 mm L, Isla San Benedicto, 27 m depth (9) *Cuthona longi* Behrens, 1985, 15 mm L, Isla Roca Partida, 85 m depth (10) *Okenia cochimi* Gosliner & Bertsch, 2004, 8 mm L, Isla San Benedicto, 29 m depth (11) *Antaeolidiella indica* (Bergh, 1888), 13 mm L, Isla Socorro, 5 m depth.

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The Festivus.
American Museum of Natural
History
Received on: 02-19-08



THE FESTIVUS

A publication of the San Diego Shell Club

ISSN 0738-9388

Volume: XL

March 13, 2008

Number: 3

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Annual dues are payable to San Diego Shell Club.
 Membership (includes family). Domestic \$20.00;
 Overseas (air mail): \$30.00; Mexico/Canada (air mail): \$20.00.

Address all correspondence to the San Diego Shell Club, Inc.,
 c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111, USA.

The Festivus is published monthly except December.
 The publication date appears on the masthead above.
 Single copies of this issue: \$5.00 plus postage.

Meeting date: third Thursday, 7:30 PM,
 Room 104, Casa Del Prado, Balboa Park, San Diego

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PROGRAM

SNEAKY SLUGS IN THE SEA OR MOLLUSKS WITHOUT SHELLS (OR BITS OF SHELLS)

Nerida Wilson from Australia, now a post-doc at
 Scripps Institution of Oceanography, will present a
 program on opisthobranchs. She'll not spend her time

specifically on nudibranchs, but on the "other" sea slugs,
 some of which have shells, or as she says "bits of
 shells."

Meeting date: March 20, 2008

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CLUB NEWS

San Diego Shell Club Meeting February 21, 2008

The meeting was called to order by President Jules Hertz at 7:37 pm. Jules introduced the guests and minutes of the previous meeting, as published in *The Festivus*, were approved by the members. The Treasurer's report was given by Silvana Vollero. Marilyn Goldammer, Corresponding Secretary, has sent letters of acknowledgment for a new book and DVD donated to the Club. Carole Hertz announced the speaker for March (see program). Wes Farmer discussed the pertinent business from the meeting of the Botanical Garden Foundation. He mentioned the need to have members offer to do some of the cleaning in the meeting room. Call Wes for more information.

Old Business: Jules announced that the Christmas dinner party has been arranged at the Butcher Shop for the first Saturday, December 6th 2008. Carole discussed the club auction/potluck, set for Saturday the 26th of April. Viewing will start at 5 pm, potluck at 6 pm, and auction at 7 pm. A sign-up for the potluck was passed around. Save these dates on your calendar. (See article, page 38 in this issue).

John LaGrange discussed the Mission Bay Survey most recently conducted at Santa Clara Point on Presidents Day. Numerous individuals brought survey material into the meeting, some to show and others to confirm identifications. John Bishop had some beautiful marginellas, and the bubble snail *Acteocina culcitella*. There was a suggestion to have the outings on the weekends, and noting that many members have to work, even on national holidays. It was hoped to have a schedule set up early to make it easier for members to make arrangements. Paul Tuskes reminded members to save a copy of their data, and send a copy to him via e-mail or regular mail. He is also sending a survey form to all members in southern California. You can download the form, and either fill it out on your computer or make and fill out a hard copy.

John LaGrange introduced the speaker Dr. Paul

Dayton who discussed Arctic marine systems. The talk combined his interest in the Arctic, anthropology, and marine mammals and he did an excellent job at blending these topics together, providing an interesting and informative talk. First, he contrasted the Arctic and Antarctic, then discussed past Arctic climates and the impact on both humans and marine mammals. He discussed current climatic trends and their impact on the ice, people, and animals. If you weren't there you missed a great presentation.

Refreshments were provided by Judy Garfield and Paul Tuskes. The door prize was won by guest Chuck Kaplan. The meeting was adjourned at approximately 8:40 pm.

Paul Tuskes

Too Late for the Roster

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NEW RECORD OF *AGATHOTOMA* (*AGATHOTOMA*)
QUADRISERIATA (DALL, 1919) (GASTROPODA: TURRIDAE)

SHAWN WIEDRICK

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Agathotoma (*Agathotoma*) *quadriseriata* (Dall, 1919:75, p.24, fig.8) is a Panamic turrid that has rarely been found throughout its range. Literature about this species is limited and most locality data is vague. The holotype (USNM 55503) is located in the National Museum of Natural History and the locality is given as "Gulf of California to Acapulco." The Acapulco specimens have been misplaced and remain missing. The only verified specimen of *A. (A.) quadriseriata* was in the collection of the Natural History Museum of Los Angeles County (LACM) and was from Bahía Concepción Baja California, México.

Both McLean *in* Keen (1971: 755, fig. 1820) and Abbott (1974: 280, fig. 3221) agreed that the distribution range was within the Gulf of California. Shasky (1997) extended the range to Bahía Saladita, near Guaymas, Sonora and off La Cruz de Huanacastle, Nayarit, México.

Three other records are from the Natural History Museum of Los Angeles County; one is from Isla Venado, Canal Zone, Panamá (8°53'N, 79°36'W) collected by James McLean in March of 1970 (LACM 1970-15.97). The second record is from a reef east of Cahuita, Limón Province, Costa Rica (9° 44.7'N, 82° 49.6'W) collected by Eugene Coan and Robert Hollywood in January of 1986 (LACM 1986-24.4). An additional specimen (Figure 1) was collected by me at Playa Langosta, Guanacaste Province, Costa Rica, in November 2004. The two Costa Rican records extend the range of *A. (A.) quadriseriata* south from Bahía Saladita near Guaymas, Sonora, México, to Isla Venado, Canal Zone, Panamá.

Finally, I would like to thank James McLean for all of his gracious assistance with the writing of this paper



Figure 1. *Agathotoma* (*Agathotoma*) *quadriseriata* (Dall, 1919), 5mm specimen from shell excursion to Costa Rica in 2004.

and for his time spent researching the material at the museum.

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1971. Family Turridae, pp. 686-766 in *Sea Shells of Tropical West America. Marine mollusks from Baja California to Peru*. Second Edition. Stanford University Press, Stanford, California. 1064 pp.

SHASKY, DONALD R.

1997. New range, depth and size records for some Panamic Province gastropods. *The Festivus* 29 (6):45-52, figs. 1-13 (June 12).

The Auction/Potluck – 2008

The San Diego Shell Club's Annual Auction/Potluck is almost upon us. If you have not already marked your calendar, do circle Saturday the 26th of April. It is the most exciting Club event of the year and one which we all look forward to.

The list of the species to be voice auctioned is almost ready and the number of special items is impressive. This year, once again, the majority of the shells are from the Billee Gerrodette and Twila Bratcher-Critchlow Collections. The list of items will be available by mid-March as PDFs for those who would like to see it. Just e-mail us at the Club's address – see front page.

Besides the special shells mentioned in the January issue, there are many others, a few of which are: *Cypraea rashleighana*, *sanctahelenae*, *aurantium*, *hesitata howelli*, *camelopardalis*; *Murexiella macgintyi*, *pelepili*, *perita*; *Trophon catalinensis*; *Pteropurpura leana*, *martinetana*; *Conus aureus*, *bartschi*; *Buccinium finnmarchianum* and many other fantastic *Latiavis*, Cones, Miters etc. In addition, many

will find some wonderful buys at the HUGE Silent Auction and the overflowing Dollar Table. The auction/potluck will be held again at the club house of Wes Farmer's condo – as it has been for the past 20 years!! The address is 3591 Ruffin Road, San Diego. A map to the affair will be enclosed with your April issue of *The Festivus*.

Festivities will begin at 5 pm for "Dave's Punch," wine and soft drinks, socializing and browsing the shells for the voice auction and the silent auction. Dinner will begin at 6 pm (remember to bring your potluck dish to serve 12). If you have any questions concerning your potluck contribution, contact Carole Hertz at: 858-277-6259. The voice auction will begin PROMPTLY at 7 pm.

Besides being the most "fun" event of the year, the proceeds from the Auction support *The Festivus*, Club donations to scientific organizations, the Club library and help to keep the membership costs low.

Plan to be there. It's the best!!

ANOTHER WAY TO COLLECT SHELLS: BUYING ON EBAY

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About two years ago I decided to expand my shell collection that I had started when I was about seven. Back then, in the late 1960s, there were a number of shell shops up and down the Southern California coast. So I decided to visit the shops that I had spent so much time in as a child. I was surprised and disappointed to find that they were all gone. I began searching the Internet to locate shell stores in my area only to find that there were very few and most did not carry specimen shells. I then turned to Ebay. Since I was a cowrie collector, my first attempts at finding specimens shells using the search term "cowries" only identified items that incorporated or were made of these shells. However, in those listings were a couple of shells using the scientific name "*Cypraea*." So I used this term in my next search and "bingo" I found about 300 listings. Over the past couple of years the average number of these listings has increased to about 500 and because of this I have found Ebay to be an incredible resource for shells.

Shell collectors who are self-collectors will appreciate the rare shells that oftentimes appear on Ebay. These are shells that are generally the most difficult to find on self-collecting trips due to their scarcity, depth or location. Collectors that have been to an area where such shells have been reported in the past but have been unable to find that particular shell can sometimes find these shells on Ebay. Those individuals that buy from dealers may find that Ebay provides a new forum without fixed prices and the opportunity to obtain that perfect shell for less (Figures 1-8). In addition, dealers often do not have the selection that a world market such as Ebay can provide, thereby allowing the most avid shell collectors the ability to enhance and complete their collections.

If you would like to buy or sell on Ebay you must first become a registered user. Registration is not complicated. To register, first log onto Ebay at www.ebay.com. When the Ebay page comes up it will say "Welcome! Sign in or Register" in the upper portion of the page. Click on "Register" and a registration form will appear. Fill in your

personal information – first name, last name, street address, city and e-mail address. Then create your personal Ebay User ID and password. Once you agree to the terms and conditions of membership you are on your way. But before you get started there are a few things you need to know.

First, bidding is almost like gambling, once you start it's hard to stop. To avoid paying too much for a shell, know in advance what you are willing to spend for the shell before you begin bidding.

Second, try not to initiate a bidding war for a shell. Placing a bid early in the auction lets others know you're interested. I generally do not bid on a shell until the last 30 seconds of the auction. This prevents all but the most diligent buyers from bidding against me.

Third, read the listing to determine if there are any additional costs you will be responsible for paying such as shipping. For smaller or lightweight shells the shipping costs are generally provided as flat rates. However, depending on where the shell is located and its weight this can be expensive.

Fourth, view all of the photos carefully to assure that the quality of the shell is consistent with the grade listed. Because grading is subjective, the grade given by the seller may not be the same as what you might give the shell. Consequently, if there is only one photo you will not be able to see all aspects of the shell and you should bid accordingly.

Fifth, make sure that you note the ending time of the auction so that you can place your bids appropriately and increase your chances of winning the shell. Usually items are listed for seven days but this can vary.

Sixth, all sellers are not reputable. Unfortunately there is no sure way of determining who is or is not a reputable seller. I have had a seller use another seller's photo of an item in gem condition to represent her item which was less than average quality. I have also had a seller send a similar shell which was not the one shown in the listing, and I have had a seller use a photo which stated that it was a file photo

and that the items sent would be of similar quality too, but not the ones in the photo. Of course the items in the photo were substantially better quality than those sent. I always print a copy of the photos for comparison to assure the item received is the one in the listing.

As you purchase on Ebay you will begin to create a set of general rules to follow. For example, because of the difficulty of pursuing a foreign seller in the event of a problem I typically buy from individuals that reside in the United States unless they are well-known overseas sellers. I generally do not buy from sellers that post above average shipping costs and I don't purchase from sellers that do not post pictures of their shells. When I am bidding on a shell from a new seller, I generally purchase a lower cost shell to assess the transaction before buying a more costly one. Rules like these will help you identify sellers you can rely on for quality and reasonable shipping costs.

In an auction items are listed for set periods of time, generally for seven days. They may be listed with or without reserve. A reserve price is the amount the bidding must reach before the item can be sold. This amount is secret and unknown to the bidder until that reserve amount is met. If the amount never meets the reserve limit for the auction period the item is not sold.

The bidding process can be complicated. When you bid on an item, such as a shell, the amount of the bid is recorded and the bid shown is the next minimum incremental amount over the preceding highest bid. For example, say bidder X has placed his bid at \$5.00 for a shell listed for \$1.00 (with say a \$1.00 minimal incremental bid). The amount shown for X's bid will be \$1.00. When bidder Y bids \$2.00 for the shell, Ebay records that bid and automatically raises the bid to \$3.00 for X. So that the listing will now show X as the highest bidder at \$3.00. Bidder Z then places a bid of \$7.50 for the shell. Ebay will record the bid, and place Z as the highest bidder at \$6.00 and so on.

Bidding and bidding methods vary from person to person. On Ebay there are several tactics I have used depending on the circumstances. If I really want the shell I will wait until the last 10 to 30 seconds before bidding.

This is often successful because the current bidder does not know that I will be bidding on the shell and my bid is so close to the end of the auction that the previous bidder does not have time to place another bid.

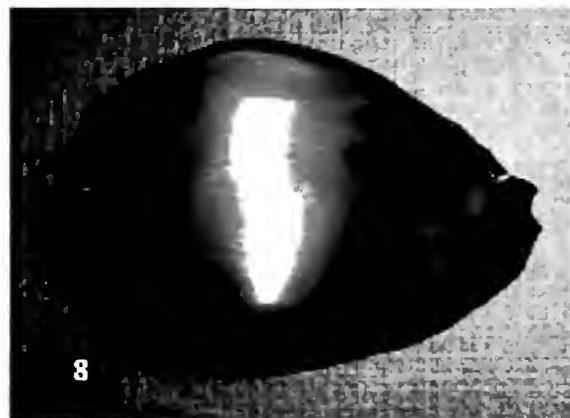
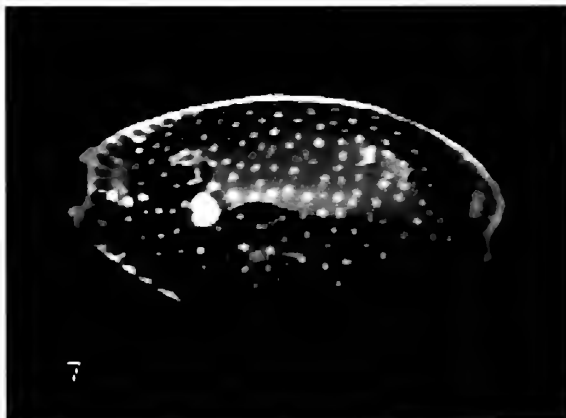
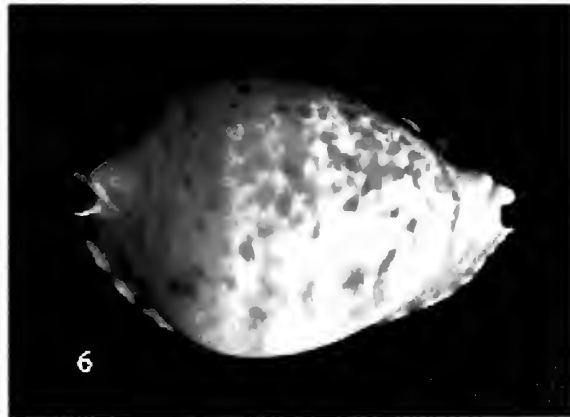
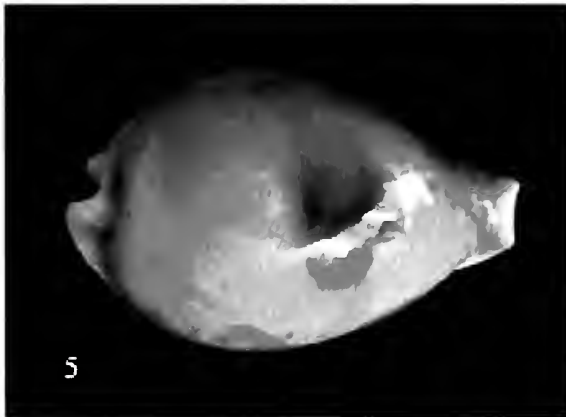
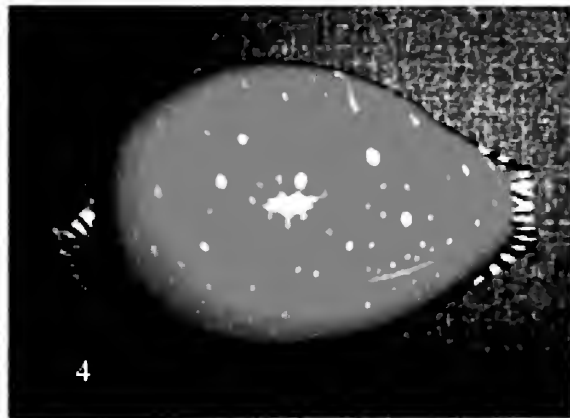
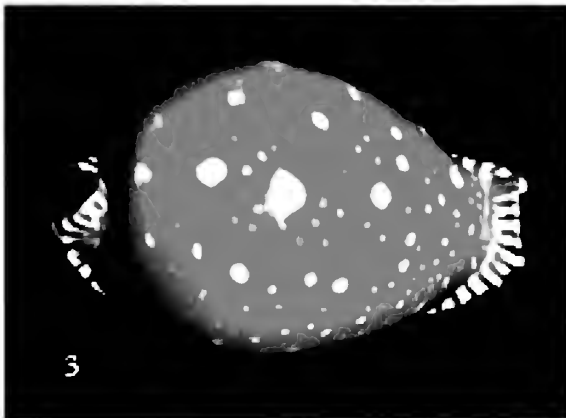
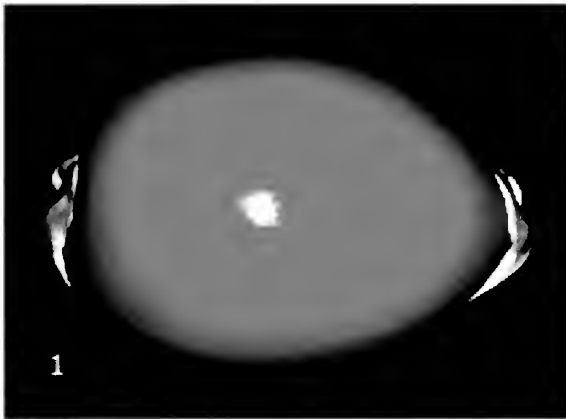
However, this tactic can fail if the opposing bidder is using a "sniper program." A sniper program is software that allows the bidder to make minimum incremental bids at high speed to reach and overtake the former bid before the opponent can place another bid. Their advantage is that they can place a large number of bids in a matter of a few seconds. For example, X places a \$5.00 bid for a \$1.00 shell. The bid is recorded and X becomes the high bidder at \$1.00. Y uses a sniper program and sets a limit of \$10.00. At 10 seconds before the end of the auction the program raises the bid overtaking X and secures a winning bid for Y at \$6.00. These programs do have one limitation. The program will only place bids based on the amount set by the person using the program. Consequently, a sniper can fail if the bid limit is below the opponent's highest bid. For example, X bids \$25.00 for a shell listed for \$2.00. Ebay will record X's bid and show that X is the highest bidder at \$2.00. Bidder Y uses a sniper program and sets the limit at \$20.00. At 10 seconds before the end of the auction, the sniper program attempts to overtake the previous bidder but the previous bidder's bid is higher than Y's bid so X wins the shell for \$21.00.

In the circumstance in which I would like the shell but am only willing to pay X dollars I am not held captive by the computer to attempt to win the item in the last seconds of the auction. I can place the bid anytime. This is generally successful for lower-priced common shells.

There are a number of unscrupulous sellers on Ebay so be alert and careful. Ebay does not have the manpower or the capability to prevent these individuals from committing fraud. The most common is not receiving the item purchased. If this occurs with a seller in the United States, the buyer has some remedy and the action taken will depend on how the item was purchased, such as by check, credit card or through a payment service like PayPal. Unfortunately this usually occurs with sellers from other countries where remedy is difficult to obtain. The "bait and

Figures 1-8.

(1) *Cypraea aurantium* Gmelin, 1791. GEM 105.0 mm \$154.00, Rice's Prices \$275.00 (2) *Cypraea eburnea* Barnes, 1824. GEM 47.5 mm, \$28.50, Rice's Prices \$235.00 (3) *Cypraea guttata* Gmelin, 1791. GEM 60.0 mm, \$32.50, Rice's Prices \$200.00 (4) *Cypraea guttata surinensis* Massilia, 1978. GEM 52.0 mm, \$119.00, Rice's Prices \$235.00 (5) *Cypraea hirasei* Roberts, 1913. GEM 40 mm, \$155, Rice's Prices \$350 (6) *Cypraea marginata consueta* Biraghi, 1993. GEM 62.0 mm, \$103.50, Rice's Prices \$165.00 (7) *Cypraea semiplota* Mighels, 1845. GEM 16.5 mm, \$32.50, Rice's Prices \$75.00 (8) *Cypraea rosselli* Cotton, 1948. GEM 45.0 mm, \$124.00, Rice's Prices \$195.00



switch" is another technique used by these sellers. In a bait and switch the item received is generally not the item shown in the listing and the seller refuses to refund the money or offers to refund the money once the item is returned. However, once the item is returned no refund is sent. Another unscrupulous technique that is used to increase bidding on an item is through the use of a "shell". The shell bids on the item based on the seller's instruction with the hope of instigating a bidding frenzy or war. The use of a shell is strictly prohibited by Ebay but difficult to enforce and once it starts the seller generally receives several times what he/she would have gotten absent the use of a shell.

Ebay permits buyers and sellers to interact during an auction. This can be very helpful if there are questions such as the condition of a shell, reduction of shipping costs for multiple purchases and/or location of the shell. Oftentimes a seller will be happy to provide additional photos of the shell or combine shells for a single shipping cost. But if you don't ask you may be purchasing a shell that is not in the condition you would like or paying a substantial amount for shipping, increasing the cost beyond what you intended to pay for the shell in the first place.

Once the auction is over you should receive a billing statement from the seller informing you of the amount to be paid. Once the seller receives the payment the item is shipped. If you are buying a number of items, I recommend maintaining the winning bid notices in a folder. When you receive your items remove the corresponding notice. This will help you keep track of the items purchased and received. Often a seller misplaces or

forgets to send an item. A kind reminder generally resolves the problem although not always.

Most sellers accept a variety of payment methods. One payment method accepted almost universally is PayPal. In order to use PayPal you must have an account. To establish an account go to www.paypal.com and click on the button at the top center of the screen which says "Sign Up Now!". A window will present you with three account options; a "Personal Account", a "Premier Account" and a "Business Account". I recommend a personal account for now. Click on the button in the center of the "Personal Account" window that says "Start Now" and fill in the information requested. They will require a credit card number as collateral to assure that payments can be made upon request. I recommend selecting a credit card with a low limit to protect you in the event of identity theft.

I highly recommend purchasing shells on Ebay provided you remember the six items I have discussed above. Figures 1-8 show some of the shells that I have obtained on Ebay at reasonable prices. The condition, size and the price I paid for them are listed for each of the *Cypraea* shown. Also provided is the value listed from the 2007 Rice's Prices catalog (23rd edition) for the type, size, location and condition of each shell.

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THE TWELFTH ANNUAL SCUM MEETING

LINDSEY T. GROVES

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The twelfth annual meeting of the Southern California Unified Malacologists (SCUM) was held on 19 January 2008 in the Education Science Classroom of the Natural History Museum of Los Angeles County (LACM). Thirty-five professional, amateur, and student malacologists and molluscan paleontologists attended the event. For the record there were seven first time SCUM attendees. Breakfast-style refreshments, courtesy of Lindsey Groves and the LACM Education Division were available at 8:00 am and the meeting was convened at 9:00 am. SCUM XII host Lindsey Groves, Collection Manager of Malacology at LACM, welcomed the group and updated everyone on recent news and upcoming malacological meetings. Without doubt the most newsworthy item was that Malacology curator Dr. Ángel Valdés has left LACM in favor of a teaching career at California State Polytechnical University, Pomona where he will be teaching evolutionary biology and marine biology in addition to continuing his research on the phylogeny of opisthobranch mollusks. The move is terrific for Ángel but detrimental to LACM where 15 curators have left the institution over the past five years for a variety of reasons. Nevertheless, SCUM wishes him well.

In usual SCUM tradition all attendees were given time to introduce themselves and briefly summarize their research and/or malacological interests. A myriad of interests were discussed which ranged from strictly amateur shell collectors to advanced professionals with major research projects. Examples include Shawn Wiedrick, current President of the Pacific Conchological Club, who is fairly new to the world of malacology but has a keen interest in turrid gastropods, a difficult group even for the professionals and Richard Squires of California State University, Northridge who, on top of a full teaching schedule, always has numerous research projects in progress on various fossil mollusks, many with Louella Saul of LACM Invertebrate Paleontology.

Following the introductory session, five attendees gave more detailed presentations of their research. Wes

Farmer spoke of how he became interested in sea-slugs through collecting them, photographing them, making clay models of them, and making repeated visits to the San Diego Natural History Museum when he was younger. He also reminisced about making plastic models of sea-slugs for various museum exhibits and several that were presented to a royal entourage that visited San Diego in the 1960s. He also exhibited several examples of original sea-slug art work that he had painted and offered them for sale.

Hans Bertsch presented *Biogeografía alimenticia de los opisthobranquios del noroeste Pacífico* [*Feeding biogeography of northeast Pacific opisthobranchs*] which he previously presented with Alicia Hermosillo. The project is a long-term study of the feeding strategies, biodiversity, and population dynamics of various opisthobranchs from Pacific Grove, Monterey Bay, California, two areas in Bahía de los Angeles, Baja California, México, and two areas in Bahía de las Banderas, Jalisco/Nayarit, México. Feeding strategies vary according to genus. The genera *Aplysia* and *Elysia* feed on algae while *Flabellina* feeds on cnidarians, *Glossodoris* feeds on poriferans, *Tambja* feeds on ectopods, and *Navanax* is an active predator on other opisthobranchs. Hans also had autographed copies of *Sea of Cortez Marine Invertebrates* Second Edition (Revised) for sale that was co-authored with the late Alex Kerstitch. This edition features 300+ illustrations of living specimens of the major marine phyla, especially the mollusks.

Jim McLean then presented *Updating the gastropod fauna of the northeast Pacific and the north Pacific*, which was a progress report on his long awaited two volume identification guide of northeast Pacific shelled gastropods, which will feature detailed synonymies of 1200+ known and 400+ new species. He reported on how the project has evolved with advancing technology and how he has coped with outdated references and uncertain funding since his retirement in 2001. "Is it an exact science," he asked and answered that it is more

intuitive and perhaps a bit old fashioned but it is readily needed by ecologists, biologists, and collectors alike. The southern book will cover species from British Columbia to central Baja California, México and the northern book will cover the area from 40°N to the Arctic and the Russian Far East (with overlap from northern California to British Columbia). He noted high species diversity in *Lirularia* (Trochidae), *Ocenebrina* (Muricidae), *Admete* (Cancellariidae), and *Daphnella* (turritiform Conidae) amongst others. For the future he noted that updates, additions, and corrections will have to be published via the internet as he will be unlikely to do a revision. As most of the plates are complete and the text is undergoing editing, the first volume is still likely 1-2 years away.

First time SCUM attendee Benjamin Pister, a marine biologist with the National Park Service at Point Loma National Monument, San Diego, California, pre-

sented *Cabrillo National Monument: A great place to study mollusks*. His goal was to convince people to come to Point Loma National Monument to do research. He presented a brief history of the monument, an introduction to the marine resources available, and a synopsis of the permitting process necessary for research. It was noted that the process of inventory and research along with monitoring could produce an informed and adaptive management plan for the monument resources. The monument is divided into three management areas established for use as a baseline to allow for recovery and protection of the approximately 160 known mollusk species determined from previous surveys in the 1970s. Amongst several questions asked, pertinent ones included "What is causing the decline of *Mytilus* and *Lottia gigantea* within the park?" and "What is the effect of human exclusion/high visitation on marine organisms?"



Photo Caption: **Front Row:** Lindsey Groves, George Davis, Don Cadien, Kathy Kalohi, LouElla Saul, Debbie Roman, Hans Bertsch, Richard Squires **2nd Row:** Constance Gramlich, Bob Moore, Lawrence Mosher, Shawn Wiedrick, Charles Powell II, Rosa Campay-Bertsch, Carol Stadum
Photo Caption: **Front row:** Lindsey Groves, George Davis, Don Cadien, Kathy Kalohi, LouElla Saul, Debbie Roman, Hans Bertsch, Richard Squires **2nd row:** Constance Gramlich, Bob Moore, Lawrence Mosher, Shawn Wiedrick, Charles Powell II, Rosa Campay-Bertsch, Carol Stadum
3rd row: Phil Liff-Grieff, Terry Rutkas, Ángel Valdés, Mike Vendrasco **4th row:** John Alderson, Bob Stanton, Doug Eernisse, Lance Gilbertson, Jim McLean, Bob Dees, James Jacobs, Christine Fernandez **Top row:** Scott Rugh, Mike Kirby, Wes Farmer, Benjamin Pister, Pat LaFollette, Bill Huber, Maggie Carrino, George Kennedy

Photo courtesy of George Davis

Those interested in these questions and others should see <http://science.nature.nps.gov/research/ac/ResearchIndex> or contact Benjamin directly at Benjamin.Pister@nps.com for details.

Last, but certainly not least, Doug Eernisse took the group on a tour of his myriad of current research projects in press with colleagues and grad students, many whilst on sabbatical at Duke University, including, among others: reconstructing radiations by the chiton genus *Mopalia* in the North Pacific (with R. Kelly); effects of sampling bias on the fossil record of chitons (with S.S. Puchalski & C.C. Johnson); and aesthete canal morphology in the Mopaliidae (with M.J. Vendrasco, C.Z. Fernandez, & B. Runnegar). Published projects in 2007 included the chiton chapters in the *Encyclopedia of Tidepools and Rocky Shores* and *Light and Smith Manual* (with R.N. Clark &

A. Draeger), latitudinal gradients in gene flow in the marine environment (with R. Kelly), DNA barcoding using chitons (with R. Kelly, I.N. Sarkar, & R. Desalle), and genetic evidence for the cryptic species pair *Lottia digitalis* and *L. austrodigitalis* (with L.T. Crummett). All of this on top of teaching duties at California State University, Fullerton!

During the lunch break and following the meeting, attendees had the opportunity to tour the LACM galleries, one of which was closing the following week for installation of new exhibit and two long-time exhibits that are scheduled to close in February and March as part of a major renovation of the LACM exhibit halls. Several SCUM attendees also visited the world-class Malacology section following the meeting. SCUM XIII will be hosted by Ángel Valdés at Cal Poly, Pomona in January of 2009.

The Festivus.
American Museum of Natural
History
Received on: 03-18-08



THE FESTIVUS

A publication of the San Diego Shell Club

ISSN 0738-9388

Volume: XL

April 10, 2008

Number: 4

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Membership (includes family). Domestic \$20.00;
Overseas (air mail):\$30.00; Mexico/Canada (air mail):\$20.00.

Address all correspondence to the San Diego Shell Club, Inc.,
c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111, USA.

The Festivus is published monthly except December.
The publication date appears on the masthead above.
Single copies of this issue: \$5.00 plus postage.

Meeting date: third Thursday, 7:30 PM.
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PROGRAM

COME TO THE AUCTION/POTLUCK

SATURDAY EVENING, APRIL 26TH

There is no regular meeting this month. See map to auction included with this issue.

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CLUB NEWS

San Diego Shell Club Meeting March 20, 2008

Jules Hertz called the meeting to order at 7:40 pm. The February minutes were approved and accepted without change. The treasurer was absent, so there was no report. The librarian, Marilyn Goldammer, encouraged everyone to use the library, as the Club has a large collection of useful publications.

Carole Hertz reminded us that the Club shell auction/potluck is Saturday April 26th. Please visit and view the shells starting at 5 pm, with dinner at 6 pm. The voice auction starts at 7 pm. If you have not signed up for food, please remember to bring something to share that serves 12. Funds from the auction, and your donations, support *The Festivus*, the Club library, student grants and Club activities.

A big thanks to the Goldammers for evaluating and selecting a replacement for our non-functional digital projector.

Our March speaker was Dr. Nerida Wilson. Nerida is from Melbourne, Australia and doing her postdoctoral research at Scripps Institution of Oceanography. She provided an excellent overview of the emerging relationships within the opisthobranchs. Convergent evolution can make the use of morphology difficult for evaluating evolutionary relationships. The use of DNA studies is helping to identify and resolve some of the more confusing relationships. The slides and presentation were very interesting. If you weren't there, you missed another good presentation.

Following the presentation the meeting was adjourned to socialize with the speaker and other friends and to enjoy the refreshments provided by the Goldammers and the Hertzes.

Paul Tuskes

The Club's Website Has a New Address

Thanks to the efforts of member Bob Dees, the Club's website is finally coming back to life. The new address is <http://sandiegoshellclub.com>. The site is now being reconstructed and you can access it and watch as it changes, is corrected and improved. It may take awhile before it is finished, but it is now current and the information you might need is already there.

The Western Society of Malacologists (WSM) June 4-8, 2008

The WSM will hold its 41st annual conference in Menlo Park, California from June 4-8, 2008. The venue will be the U.S. Geological Survey complex at 345 Middlefield Road, Menlo Park. The conference will begin Wednesday morning with registration and viewing of submitted posters. Talks will start in the afternoon and continue through Saturday. A special session in honor of Ellen Moore, late of the USGS, will be hosted by George Kennedy. Sunday, a field trip to the abundantly fossiliferous (both invertebrates and vertebrates) and well-studied sea cliffs at Capitola near Santa Cruz will conclude the meeting.

A deadline for submitting abstracts on any subject dealing with mollusks is May 10th. They should be submitted to Charles Powell at cpowell@usgs.gov. Further information can be found at <http://biology.fullerton.edu/wsm/conferences.html>.

Students are encouraged to attend. Payment for the meeting and (or) field trip can be waived for students who volunteer 4 hours (or 8 hours if both the meeting and field trip are attended) at or preceding the meeting. Work will include registration, AV, and general help running the meeting (as needed). Contact Charles Powell (cpowell@usgs.gov) for more information.

We look forward to seeing you in Menlo Park this summer.

SCAMIT Meeting "Bivalves 101" May 12, 2008

The meeting of the Southern California Association of Marine Invertebrate Taxonomists (SCAMIT) which will be held on Monday May 12, 2008 at the Santa Barbara Museum of Natural History, will focus on mollusks. The topic for the meeting is "Bivalves 101" which will be led by the Museum's bivalve specialist, Paul Valentich-Scott.

Too Late for the Roster Roberts, Dale

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THREE NOMENCLATURAL NOTES ON PANAMIC BIVALVES

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In the process of writing our forthcoming book on the bivalve mollusks of tropical western America, we have encountered a number of nomenclatural problems. We herewith untangle three of these issues and illustrate the species in question.

I. *Pleuro lucina undata* (Carpenter, 1865) (Figure 1)

This is a case of an improperly renamed junior homonym. Hertlein & Strong (1945: 105) renamed *Lucina undata* Carpenter, 1865 (p. 279), as *Lucina undatoides*, because of "the prior use of that combination of names by Lamarck, 1819."

However, there is no such Lamarckian taxon. Lamarck (1818: 543) had placed *Venus undata* Pennant, 1777 (plate 58, figure 51), in the genus *Lucina*. Well before the era of Hertlein & Strong, this well-known British species was universally placed in the genus *Mysia* Lamarck, 1818: 543, or its junior synonym *Lucinopsis* Forbes & Hanley, 1848: 433, belonging to the Veneridae or Petricolidae (for example, Lamy, 1920: 75, 205).

Hertlein & Strong relied in several cases on ambiguous entries in nomenclators without researching the status of the earlier names involved. In this case, as in some others, they would not have concluded that the taxa involved were secondary homonyms if they had examined the literature.

Moreover, Hertlein & Strong's "type" of *Lucina undatoides* has no status, even if Carpenter's name had been properly replaced. The Hertlein & Strong replacement name was clearly proposed as such and not expressly as a new species, thus Carpenter's type specimens would also apply to the new name.

Pleuro lucina undata (Carpenter, 1865) is one of three Panamic members of this lucinid genus (Figure 1), one of which is as yet unnamed. It is restricted to the Golfo de California, México, from the intertidal zone to 60 m depth. Thus, the Hertlein & Strong unnecessary replacement name becomes a junior synonym.

II. *Spondylus limbatus* G. B. Sowerby II, 1847 (Figure 2)

Spondylus calcifer Carpenter, 1857 (p. 152), is one of the most typical Panamic bivalves. Indeed, Carpenter himself extracted many species in his famous Mazatlán catalogue by breaking up shells of *S. calcifer*. Found in and on these shells were not only various borers and nestlers, but also many gastropods that had taken refuge in their abandoned burrows and other niches and crevices. Indeed, he even smashed the type material of *S. calcifer* itself in his search (Keen, 1968: 393)!

It thus came as somewhat of a shock to discover this well-known species placed into synonymy in a paper focused chiefly on the spondylids of the eastern Atlantic (Lamprell et al., 2001: 615). As it turns out, *Spondylus limbatus* G. B. Sowerby II, 1847 (1847a: 87; 1847b: 427, plate 88, figure 51), described from the "Persian Gulf", was not from there at all, but rather was instead from the eastern Pacific [BMNH 1846.12.4.1], giving it a decade's precedence over *S. calcifer*.

Unfortunately, the name *S. limbatus* has been repeatedly used in the literature, albeit in the wrong province, so that it is not a *nomen oblitum* under the current *International Code of Zoological Nomenclature* (ICZN, 1999), so as to trigger its "Reversal of precedence" provisions (Article 23.9.1-2), and the name *S. calcifer* is not so universally known that we feel it worthwhile to prepare a petition to the International Commission to conserve it under Article 23.9.3. As a result, we propose to use the earliest available name for the species, *S. limbatus*, for the eastern Pacific species.

The species occurs from Bahía de Choya, Sonora, México, to Caleta Mero, Tumbes, Perú, from the intertidal zone to 18 m.

III. *Chionopsis lilacina* (Carpenter, 1864) (Figure 3)

This is another case of a homonym that never was, together with the unearthing of some long-overlooked type specimens.

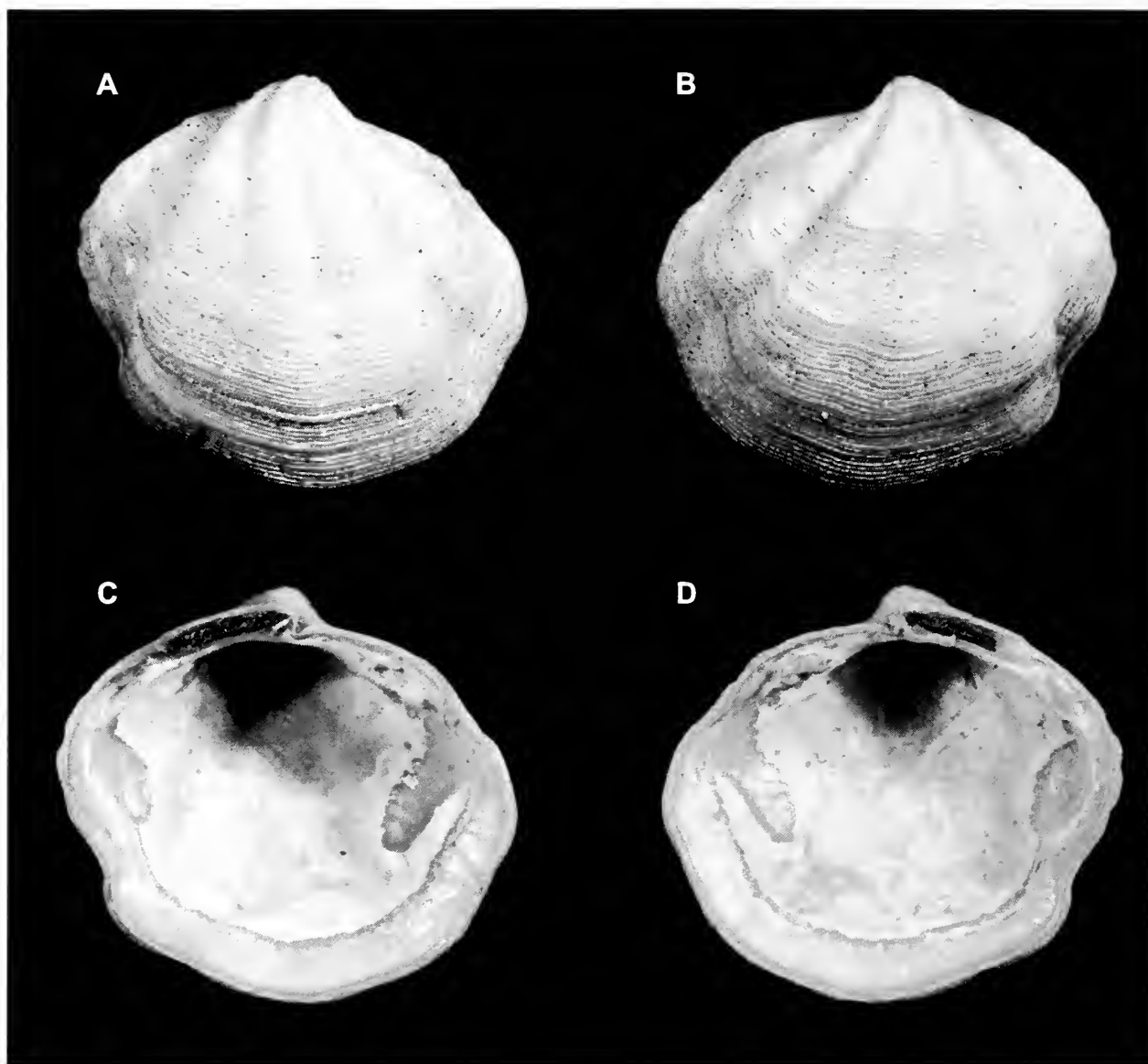


Figure 1. *Pleurolucina undata* (Carpenter, 1865), SBMNH 127307, México, Baja California Sur, La Paz, shell length = 15 mm; **A**, external right; **B**, external left; **C**, internal left; **D**, internal right.

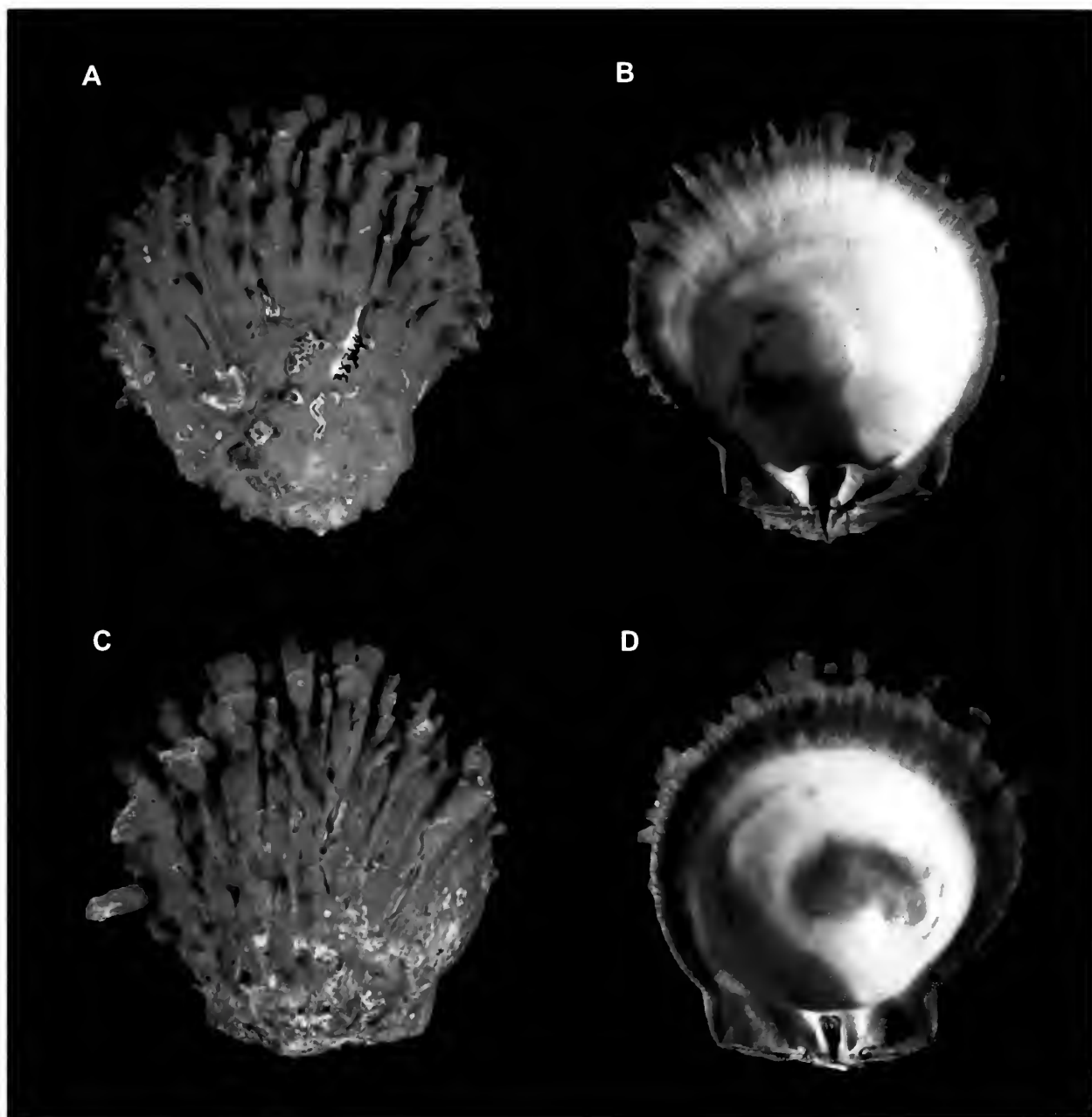


Figure 2. *Spondylus limbatus* G. B. Sowerby II, 1847, SBMNH 138364, México, Baja California Sur, Punta Chivato, shell length = 77 mm; **A**, external right; **B**, internal right; **C**, external left; **D**, internal left.

Carpenter (1864: 570) proposed the name *Venus crenatula lilacina* for an eastern Pacific subspecies of the western Atlantic *Venus crenatula* G. B. Sowerby II, 1853, ex Chemnitz ms (p. 729, plate 161, figure 190). The earliest name for the western Atlantic species is now considered to be *Venus pubera* Bory de Saint-Vincent, 1827, ex Valenciennes ms (p. 152; pl. 267, fig. 4).

Carpenter's taxon was based on an eastern Pacific lot figured by Reeve (1863: plate 13, figure 46). He found these specimens differed from West Indian material in details of sculpture and external markings, and presumably in terms of its internal lilac blush, hence the name. Carpenter referred, rather ambiguously, to additional material sent by Xantus either to the BMNH or the USNM. Thus, we **herein designate** as the **lectotype** the specimen illustrated by Reeve (BMNH 20050240-1) (Figure 3).

Dall (1902: 393) then offered *Chione purpurissata* as a replacement name for the eastern Pacific *Chione lilacina* (Carpenter, 1864) on the grounds that it was preoccupied by "*Chione lilacina* (Gray, 1838)". However, there is no such taxon. Gray (1838: 305) had merely placed *Callista lilacina* Lamarck, 1818 (pp. 564-565), in the genus *Chione*. Lamarck's taxon is now regarded as a synonym of *Callista erycina* (Linnaeus, 1758) (p. 686, originally described as *Venus*), a smooth-shelled Indo-Pacific member of the Pitarinae (Habe, 1977: 270; Oliver, 1992: 187). Thus, had he reviewed the literature, Dall (1902) would certainly not have regarded these two taxa as belonging to the same genus.

The eastern Pacific *Chione lilacina* occurs from Bahía de Los Angeles, Baja California, and Puerto Lobos, Sonora, México, to Playas de Villamil, Guayas, Ecuador, from the intertidal zone to 80 m depth. It differs from the closely related western Atlantic *C. pubera* in being proportionately higher and in having the internal lilac blush. Dall's unnecessary replacement name should be regarded as a junior synonym.

Acknowledgments

We are very appreciative for assistance from Dr. John Taylor (BMNH) in finding the Carpenter type specimens of *Chionopsis lilacina*, and Kathie Way and Amelia MacLellan (both BMNH) for arranging the loan of these important specimens. Patricia Sadeghian (SBMNH) photographed the specimens of *Pleurolocina undata* and *Spondylus limbatus*. We also thank Richard E. Petit for useful comments on the manuscript.

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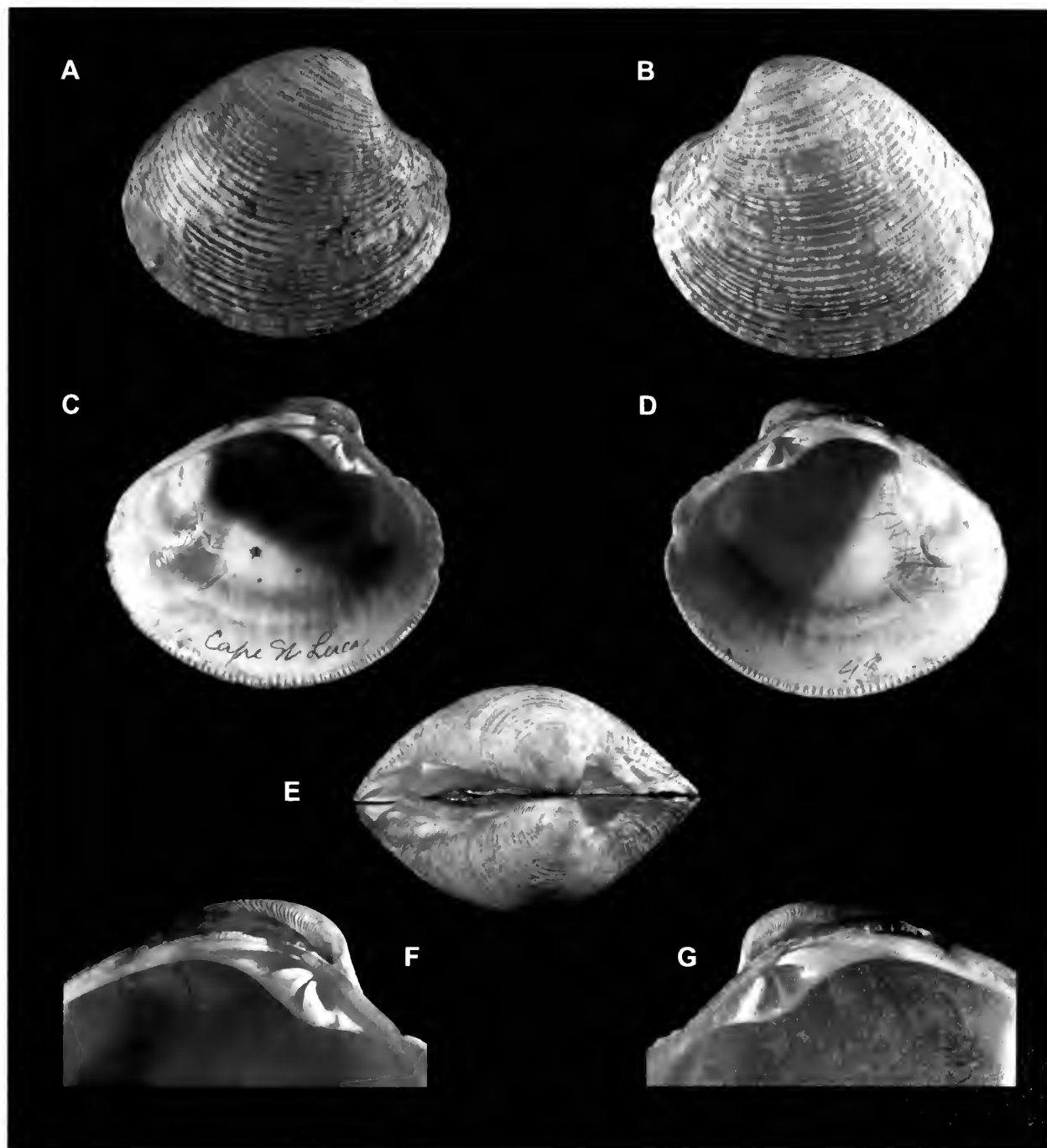


Figure 3. *Chionopsis lilacina* (Carpenter, 1864), **lectotype herein**, BMNH 20050240-1, México, Baja California Sur, Cabo San Lucas, shell length = 66 mm; **A**, external right; **B**, external left; **C**, internal left; **D**, internal right; **E**, external dorsal; **F**, right hinge; **G**, left hinge.

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OCTOPUS SENESENCE: FORGETTING HOW TO EAT CLAMS

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The Pacific red octopus (*Octopus rubescens* Berry, 1953) is a small species that is the most common octopus on the American west coast (Hochberg & Fields, 1980). It grows to over 400 g (Hochberg, 1998) but is commonly 100 g with an arm span of about 30 cm (Anderson, 1994). In Puget Sound they frequently inhabit discarded beer bottles on the sea floor (Anderson, et al., 1999).

Like other octopus species, males and sometimes females live through a stage called senescence before they die (Anderson, et al., 2002). Males after mating and females after their eggs hatch gradually go into senescence (ibid.) where they stop eating, develop skin lesions as their immune systems crash (Van Heukelem, 1977), stop "denning up" and get "hollow eyes" from the skin retracting around their eyes giving them an open, staring appearance (Anderson, et al., 2002). In addition to no longer lurking in dens, they begin to crawl about erratically without purpose, and they don't seem to recognize food, irritations such as stinging anemones, other octopuses, or even themselves as they sometimes will chew on their own arms.

Since octopuses use several intelligent methods to open and access live clams for feeding (Anderson & Mather, 2007) including

- pulling them apart
- chipping the edges and injecting venom, or
- drilling a tiny hole in the shell and injecting venom, depending on the varying species of clams,

looking at how red octopuses drill clams at the end of their lives should be yet another good indicator of life stage timing, telling whether an individual octopus had entered senescence or not. Red octopuses usually drill clams with their radula in combination with secreting a

substance that dissolves shell material (Nixon & Macconnaghie, 1988) much as a moon snail drills a hole in a clam shell (Bernard, 1967). The hole is mean 1.4 mm on the outer surface of the clam shell and 0.4 mm (Figure 1) as measured on the inner surface (Anderson, et al., in submission). They then inject a salivary venom through the hole which is quite potent (Anderson, 1999) that relaxes and kills the clam quickly. Red octopuses nearly always drill over the anterior or posterior muscle scars, presumably to weaken the clam for easier opening (Anderson, et al., in submission)



Figure 1. A drill hole by red octopus through a Manila clam shell. Note the dissolution of shell material around the exterior of the hole and the rasp marks inside the hole by the radula.

*corresponding author

The chance possession of a male red octopus at the Seattle Aquarium about to enter senescence provided the opportunity to investigate the phenomenon. As he was eating live Manila clams, *Venerupis philippinarum* (Adams & Reeve, 1850) commercially obtained as his primary food, the last 50 clams he opened were collected and the shells examined for method of entry. The clams were mean 38 mm in length ($n = 10$; S.D. = 1.4). The first 10 of the 50 were compared to the last 10 opened (Table 1). He opened but did not eat four out of the last 10 clams, leaving the flesh inside the shells. During the time (125 days) these last 50 clams were eaten the octopus went from 258 g to 177 g. He died 13 days after the last clam was opened, having undergone a typical weight loss during senescence (Anderson, et al., 2002).

There were several obvious changes in the methods of clam entry as the octopus senesced (Table 1). The octopus ate the first 10 clams in 14 days, but took 40 days to eat the last 10. The proportion of clams drilled was statistically indistinguishable (Pearson's chi-square tests, $P > 0.5$). However, the other descriptions of feeding activity were significantly different at the $[\alpha] = 0.05$ level. The octopus ate all of the first 10 clams, but did not eat all of the last 10 clams he opened

($P = 0.025$). Incomplete drill holes were more frequent during later senescence ($P < 0.01$); in fact, the octopus completed all drill holes in the earlier stage. When the octopus drilled a clam (successful or not), he "missed" the preferred drill-hole site in the clam's muscle scar more often during late senescence ($P < 0.005$).

Thus we see that red octopuses, like others (Anderson, et al., 2002) stop eating when they enter senescence and they alter how, where and if they drill clams. Typically red octopuses are discriminating where they drill, choosing to drill over the anterior adductor muscles (Anderson, et al., in submission). Presumably this weakens these muscles enough to pull open the clam shells. But when an octopus enters senescence it no longer drills over the "sweet spot" and may not even drill at all, giving us another indication that an octopus is approaching what Anderson et al. (2002) called "the beginning of the end."

Acknowledgments

We thank Stephanie Zimsen of the Seattle Aquarium for help with statistics and Scottie Henderson of the University of Washington for taking SEM photographs of red octopus drill holes.

Table 1. Comparison of first 10 Manila clams opened vs last 10 opened of the last 50 opened by a red octopus.

	Days to eat 10	Eaten	Drilled	Incomplete drill holes	Drill holes in muscle scars
First 10	14	10/10	7/10	0/10	6/10
Last 10*	40	6/10	6/10	5/10	2/11*

*Two clams had multiple drill holes in them.

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ADDITION TO THE TWILA BRATCHER CRITCHLOW MEMORIAL ISSUE

[The editor thanks Lindsey S. Groves, Collection Manager, Malacology Section of the Natural History Museum of Los Angeles County for making available to *The Festivus* the following additional information for the 2007 Twila Bratcher Critchlow Memorial Issue (*The Festivus* 39(7):61-77)].

pseudotwilae, *Epifungium* Gittenberger & Gittenberger, 2005.

Type Locality: NE of Ngeremdiu, Lighthouse Reef, Palau (07°16'30"N, 134°27'25"E).

Type Material: Holotype RMNH 95190, paratypes RMNH 95181 - 95184.

Remarks: Conchologically this species very much resembles *Epifungium twilae*, hence *pseudotwilae*.

twilae, *Epitonium* Gittenberger, Goud & Gittenberger, 2000: 10-11, figs. 2, 19, 28, 32-33, 48.

Type Locality: 12 m W. Kudingareng Keke, off Ujung Pandang, Sulawesi, Indonesia.

Type Material: Holotype NNM 59094, paratypes NNM 59095/2, 59096/1, 59098/1, 59099/1, 59100/1, 59101/2, MZB/159102/1.

Remarks: Currently in the genus *Epifungium* (Gittenberger & Gittenberger, 2005)

MZB = Museum Zoologicum Bogoriense, Bogor, Indonesia; NNM = National Museum of Natural History, Leiden, Netherlands.

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GITTENBERGER A. & E. GITTENBERGER, 2005. A hitherto unnoticed adaptive radiation: Epitoniid species (Gastropoda: Epitoniidae) associated with corals (Scleractinia). *Contributions to Zoology* 74(1/2): 125-204, figs. 1-299.

GITTENBERGER, A., J. GOUD & F. GITTENBERGER, 2000. *Epitonium* (Gastropoda: Epitoniidae) associated with mushroom corals (Scleractinia: Fungiidae) from Sulawesi, Indonesia with the description of four new species. *The Nautilus* 114(1): 1-13, figs. 1-48.

LINDSEY S. GROVES

The Festivus.
American Museum of Natural
History
Received on: 04-17-08



THE FESTIVUS

A publication of the San Diego Shell Club

Volume: XL

May 8, 2008

Number: 5

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Membership (includes family). Domestic \$20.00;
Overseas (air mail):\$30.00; Mexico/Canada (air mail):\$20.00.

Address all correspondence to the San Diego Shell Club, Inc., c/o
3883 Mt. Blackburn Ave., San Diego, CA 92111, USA.

The Festivus is published monthly except December.
The publication date appears on the masthead above.
Single copies of this issue: \$5.00 plus postage.

Meeting date: third Thursday, 7:30 PM,
Room 104, Casa Del Prado, Balboa Park, San Diego

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PROGRAM

THE COOL MOLLUSKS OF MISSION BAY

Paul Tuskes and John LaGrange, co-chairs of the Club's
Mission Bay Survey project, will present an illustrated
program on the mollusks that they have seen and

photographed in Mission Bay. Following their formal
presentation, there will be an interactive session on the
Club's Mission Bay Survey project.

Meeting date: May 15, 2008

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CLUB NEWS

The Club's Annual Auction/Potluck April 26, 2008

Forty-six members and guests had a ball!! It was a great evening. Browsing the auction tables started at 5 pm. There was Dave's Punch, made by John LaGrange, and wine and soft drinks to accompany the viewing. Dinner, of delectable homemade dishes, began at 6 pm. There was John Jackson's marvelous marinated asparagus, the Goldammer's Burmese Chicken, Rosa Bertsch's zingy Peruvian Meatballs, Van Dees' Pad Thai Noodles and much more. And we won't even mention the assortment of desserts!

The voice auction started promptly at 7 pm with auctioneer Carole Hertz leading the group in enthusiastic bidding for items on the treasure-filled auction table. It was great fun – many laughs, many groans as the evening progressed.

The huge silent auction was visited regularly for the status of bids. There were wood carvings, beautifully-made drawers of shells, huge bags of craft shells etc. At the break, the dollar table was opened and a crowd hovered at the huge table searching for bargains while others visited the dessert table to get their sugar shots for the rest of the evening. The last shell wasn't bid until 10 pm. And then many stayed to help with the cleanup. We thank Wes Farmer, our longtime host (21 consecutive years), who once again made it possible for us to have the auction in this perfect venue. There were others to applaud as well.

The Club Board worked tirelessly getting the auction material ready, setting up the auction space and cleaning up. Don Pisor kindly confirmed (and corrected) identifications on some of the auction material. Silvana Vollero, treasurer, kept the tally – and will send out the bills. Grant Parlett was the auctioneer's helper delivering the winning shells to their new owners and Jim Goldammer again took over the sorting and distributing of the silent auction material – a big job.

Though most of the shells on auction were from the Billee Dilworth and Twila Bratcher collections, there were several other notable donations as well; one of a group of fine books by John Jackson and several large shells donated from the Elysa Agnew Collection.

Now we have to wait another year for the next auction – bummer!!

The Club's Website Has a New Address

Have you looked at the Club's new website lately? Thanks to new Web Manager Bob Dees, the Club's website looks beautiful and classy – filled with color, shells, and more information than ever before. There are listings of monthly titles from *The Festivus* and a page of links to many worthwhile institutions and websites.

And it's still growing! The new address is <http://sandiegoshellclub.com>. The old out-of-date website is still on Google, but will hopefully be deleted soon. You can reach the new one by entering the new address on the "search" area at the top of their page.

Two Annual Meetings Announced

The American Malacological Society (AMS) will hold its 74th annual meeting in Carbondale, Illinois from June 29 to July 3, 2008. Online registration and abstract submission are now available at the AMS website on visiting the "next meeting" page. A link to the meeting site for registration and abstract submission is there.

See <http://www.malacological.org/meetings/next.html>. You will find information on symposia, special sessions, receptions, banquet and field trips. For further questions, contact Frank E. Anderson, president at 618-453-4136 or e-mail: feander@siu.edu.

Conchologists of America (COA) will hold its annual convention from July 5-10, 2008. Entitled *Sombreros, Shells and Spurs*, this meeting will be held at the Crowne Plaza Riverwalk Hotel in San Antonio, Texas. All the necessary forms and information can be found at COA2008.ORG or the COA website at conchologistsofamerica.org.

Too Late for the Roster

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NOTES ON THE ASSOCIATION OF VESICOMYIDS AND *LUCINOMA* (MOLLUSCA: BIVALVIA) IN SOUTHERN CALIFORNIA: MODERN AND FOSSIL

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Abstract: The association of vesicomyid bivalves with the lucinid genus *Lucinoma* previously recognized off equatorial Africa, Japan and Chile is recognized here from modern and fossil records of California. Specimens of these taxa were collected from a mud volcano in outer Santa Monica Bay, Los Angeles County, southern California. The Santa Monica Bay collection extends the known depth and geographic range of the vesicomyid bivalve *Adulomya elongata* and the depth range of the lucinid *Lucinoma aequizonatum*. In addition, the association of fossil vesicomyid bivalves and *Lucinoma* are reviewed from the greater Los Angeles Basin, southern California. Other occurrences of fossil vesicomyid bivalves in southern California without mention of associated taxa are also discussed. The association of vesicomyid bivalves with *Lucinoma* has been shown to occur in deep water at or near sulfide-rich environments and these environments seem likely for southern California fossil occurrences.

Introduction

New occurrences of living *Adulomya elongata* (Dall, 1916) *vide* Amano & Kiel (2007) (Figures 1, 2, 4) and *Lucinoma aequizonatum* (Stearns, 1890) (Figures 3, 5) (Mollusca: Bivalvia) off southern California extend the previously reported depth range of the former and geographic and depth range of the latter species. In addition, the association of vesicomyids and *Lucinoma* in the southern California fossil record are reviewed. Based on the modern association of vesicomyids and *Lucinoma* the fossil occurrences are attributed to deep water (>370 m) and the presence of vesicomyids probably indicates a sulfide-rich habitat. This association appears to be restricted to the Pliocene of the greater Los Angeles Basin in southern California.

Abbreviations within the text and figure captions include LACMIP: Natural History Museum of Los Angeles County, Invertebrate Paleontology Section; USGS: U.S. Geological Survey; USNM: National Museum of Natural History, Smithsonian Institution, Washington, DC.

New Modern Occurrences

In July 2003, mollusks recovered from a short (2.1 m) piston core taken near the summit of a mud volcano in outer Santa Monica Bay, Los Angeles County were sent to the senior author for identification. Living and dead specimens of *Adulomya elongata* and *Lucinoma aequizonatum* were identified from these samples. The mud volcano is located about 24 km west-southwest of Redondo Beach, Los Angeles County at a water depth of 813 m (Normark et al., 2003a, b; Hein et al., 2006) (Figure 6). Further sampling using piston, gravity, and box corers recovered additional specimens, although most were single valves or fragments. No other molluscan taxa were collected.

Living specimens of *A. elongata* from Santa Monica Bay were collected from 813 m representing an increase in its depth range from 500-510 m previously reported by Coan et al. (2000). In addition, the occurrence of *L. aequizonatum* in outer Santa Monica Bay is a slight range extension southward from its previous reported southernmost occurrence at Point Dume, Los Angeles

County and depth range extension from a maximum of 650 m (Coan et al., 2000) to 813 m.

According to Barry et al. (1997), living "vesicomysid bivalves have been collected principally or perhaps exclusively (exact location of dredge samples are not known) in sulfide-rich habitats (e.g., hydrothermal vents, cold seeps, whale falls)..." The faunal association of vesicomysids with *Lucinoma* has, in recent years, been reported from chemosynthetic communities from the Arabian Sea (Oliver & Holmes, 2006), off central Africa (Cosel, 2006), off Japan (Kanno et al., 1989; Kanie, 1996; Majima, 1999; Nobuhara, 2001; Majima et al., 2003), and off Chile (Sellanes & Krylova, 2005; Holmes et al., 2005). Based on the assumption that depth ranges of these mollusks have changed little since the Pliocene this association is assumed to represent deep water (> 370 m) at or near sulfide sources. This is also the first record of this association from California, fossil or modern.

Fossil Occurrences

In the greater Los Angeles Basin vesicomysids, represented by *Archivesica gibbera* (Crickmay, 1929a), associated with *Lucinoma*, have been reported from the Niguel Formation near San Juan Capistrano, southern Orange County (Squires, 1991) (outside the modern Los Angeles Basin, but likely part of the ancestral Los Angeles Basin), the Towsley Formation, Los Angeles County (Winterer & Durham, 1962; Squires, 1991), at the Third Street tunnel, Los Angeles, probably from the Repetto Formation (Woodring, 1938), and from Deadman Island, San Pedro Harbor, Los Angeles County (Crickmay, 1929a, b; Squires, 1991). Also in the literature additional occurrences of *A. gibbera*, without mention of other associated taxa, are reported from Sixth and Lucas streets, Los Angeles, and the Inglewood, Montebello, and West Coyote oil fields all in the Los Angeles Basin (Woodring, 1938). In addition, two LACM collections containing vesicomysids are reported here in the Los Angeles Basin from Orange Street and from the corner of Lucas Street and Wilshire Boulevard, both in Los Angeles.

Most occurrences of *Lucinoma* in the later Neogene to Holocene of southern California are attributed to *L. annulata* (Reeve, 1850) (Moore, 1988). Reported here are the first definitive fossil occurrences of *L. aequizonatum*, from the Niguel Formation (USGS Cenozoic locality M 2753) and Deadman Island (LACMIP locality 6614). Previous fossil records associated with this species are questionably affiliated

[i.e., *L. aff. L. aequizonatum* of Woodring, 1938].

Detailed discussion of fossil occurrences for sites where vesicomysids and *Lucinoma* occur together are discussed below. Also discussed are both new occurrences of vesicomysids from the Los Angeles Basin.

Niguel Formation, San Joaquin Hills, Orange County

Archivesica gibbera, *L. annulata* and *L. aequizonatum* all occur in the Niguel Formation in southern Orange County, but the three species do not occur together in the same collection. This formation occurs outside the modern Los Angeles Basin but was likely part of the basin during the Pliocene. *Lucinoma annulata* and *L. aequizonatum* are found in many Niguel Formation collections (LACMIP and USGS). The only report of *A. gibbera* from the Niguel Formation is LACMIP locality 11942 (Squires, 1991). At this site only a single valve occurs and is associated with a small fauna, including the bivalves *Arca sisquocensis* Reinhart, 1937; *Chione* cf. *C. kanakoffi* Hertlein & Grant, 1972; *Ostrea*? sp.; *Pododesmus macrochisma* Deshayes, 1839; and gastropods *Cancellaria tritonidea* Gabb, 1866; *Crepidula* sp.; *Forreria wrighti* Jordan & Hertlein, 1926; "*Gyrineum*" sp.; and *Turritella* cf. *T. pedroana* Merriam, 1941. Unfortunately, too few extant species are present to give an accurate environmental interpretation, but the majority of the genera represented live today on the continental shelf (< ~100 m). Extinct species from this collection indicate a late Pliocene age. Most fossil collections from the Niguel Formation are from turbidity flow sandstone lenses with shallow- and deep-water mollusks intermixed (Kern & Wicander, 1974; Berman & Stadum, 1979) and that is what is assumed for LACMIP locality 11942.

Towsley Formation, Santa Susana Mountains, Los Angeles County

Specimens of *A. gibbera* [as *Calyptogena lasia* (Woodring, 1938)] from the Towsley Formation in the eastern Santa Susana Mountains are found in association with *L. cf. L. annulata* (Winterer & Durham, 1962). According to Woodring and Turnbull in Winterer and Durham's (1962) locality F17, from which both species were collected, was deposited by turbidity flow in deep water, probably between 180 and 910 m. Associated with *A. gibbera* and *L. cf. L. annulata* are several mollusks that indicate a Pliocene age, including the gastropods *Cancellaria hemphilli* Dall, 1909; "*Gyrineum*" sp.; cf. "*G.*" *elsmerensis* English, 1914; *Terebra martini* English, 1914; and *Turritella* cf. *T.*

hemphilli Merriam, 1941.

Los Angeles

Third Street Tunnel. Woodring (1938) described *P. lasia* from the Third Street Tunnel near downtown Los Angeles. Also found, presumably in the Repetto Formation, are the bivalves *Delectopecten* aff. *D. randolphi* (Dall, 1897), *Myrakeena veatchii* (Gabb, 1866) [as *Ostrea vespertina* Conrad, 1854; see Squires et al., 2006], *Larkinia camuloensis* (Osmont, 1904), *Acesta hamlini* (Dall, 1900), *Lucinoma* aff. *L. aequizonata*, *Lyropecten cerrosensis* (Gabb, 1866), *Trachycardium* cf. *T. quadragenarium* (Conrad, 1837), and gastropods *Astraea* cf. *A. gradata* Grant & Gale, 1931, *Buccinum?* sp., *Fusitriton* aff. *F. oregonensis* (Redfield, 1848), *Nassarius hamlini* (Arnold, 1907), *Plicifusus?* sp., and an indeterminate Naticidae. No detailed stratigraphic records were kept from the excavation so there is some question as to the exact stratigraphic occurrence(s) of these taxa (see Woodring, 1938), although it seems likely that they are all from the Repetto Formation (Woodring, 1938).

Too few specifically identified taxa are present from the Third Street Tunnel for accurate ecological interpretation. Chronostratigraphic significant species from the tunnel include *Larkinia camuloensis*, *Myrakeena veatchii*, *Acesta hamlini*, *Lyropecten cerrosensis*, *Astraea gradata* (questionably identified), and *Nassarius hamlini*, which indicate a Pliocene age, if they were collected together (see above).

Los Angeles - Two additional collections from Los Angeles containing both *Archivesica* and *Lucinoma* are present in LACMIP collections; LACMIP locality 3 from 30' below the surface of Orange Street, and LACMIP locality 134 at the corner of Lucas Street and Wilshire Boulevard. These collections are discussed further below.

LACMIP locality 3 was collected in 1889 by an unknown person (or persons) and precise locality information is lacking. Orange Street is located west of Hancock Park between south Fairfax Avenue and north San Vicente Boulevard. Deep-water deposits where *Archivesica* and *Lucinoma* might have been collected are not currently known from the area. However, Quinn et al. (1997) report three fossiliferous Pleistocene marine stratigraphic units from four east-west oriented core holes drilled between Hancock Park and just east of south Fairfax Avenue. Their lower two units have some specimens that appear to be reworked from older, possibly Pliocene rocks. It is unclear if any of these

units are correlative with LACMIP locality 3, but the older units of Quinn et al. (1997) indicate that Pliocene fossil material is present in the general area. Associated with *Archivesica* sp., and *L. annulata* at Orange Street are specimens of an indeterminate *Modiolus* sp. and *Glycymeris septentrionalis* (Middendorff, 1849). Unfortunately, neither of these taxa allow for a precise age or environmental interpretation.

Archivesica sp. and *L. annulata* are also present at LACMIP locality 134, collected in a ditch, exposed 2 m (6 feet) above the level of Wilshire Boulevard on the southeast corner of Lucas Street and Wilshire Boulevard in what became the east wing of Good Samaritan Hospital. These specimens were collected by G.P. Kanakoff, C. Stock and J.J. Hoppinger on August 14, 1947 and reported by them as coming from the Fernando Formation. Associated with the above taxa in this small collection are also *Modiolus* sp. and indeterminate bivalve molds. Again, too few taxa are present for precise age or environmental interpretation, and the age attributed to this collection appears based on its formational assignment, not on any species collected.

Deadman Island, San Pedro, Los Angeles County

Crickmay (1929a, b) reports *A. gibbera* associated with *L. annulata* on Deadman Island, from his zone 2. An examination of collections at LACMIP also reveals *L. aequizonatum* associated with *L. annulata*, presumably from zone 2 (LACMIP locality 6614). Unfortunately, the locality data are insufficient to accurately locate the collection stratigraphically. However, preservation is identical to another collection containing only *A. gibbera* collected from Deadman Island and *A. gibbera* is known only from Crickmay's zone 2. Crickmay (1929b) describes his zone 2 as a six-inch thick layer of hard gray shale that weathers to a rusty yellow, different from zones 3 to 6 which are composed mostly of gray silt. Crickmay's zones 1 to 6 have previously been correlated lithologically with the nearby middle Pleistocene Timms Point Silt (Crickmay, 1929b; Woodring et al., 1946; Valentine, 1961), but recent work (Powell & Ponti, 2007), outlined below, refers zones 1 and 2 to an older unnamed Pliocene formation.

The Deadman Island occurrence of *Archivesica* was thought to represent the only Pleistocene occurrence of a vesicomid in southern California, but the age is based on lithologic correlation that, as stated above, does not appear to hold up (Powell & Ponti, 2007). Three lines of evidence indicate that Crickmay's zone 2 (and zone

1 by superposition) on Deadman Island are not middle Pleistocene, but likely late Pliocene. First, all other dated occurrences of *A. gibbera* appear to be restricted to the Pliocene. Second, mollusks from Crickmay's bed 2 on Deadman Island indicate much deeper water than any Pleistocene deposits in California. Although mollusks indicating similar deep-water depths are known from several Pliocene deposits in the Los Angeles Basin. This leads directly to the third and probably strongest reason, uplift rates. Uplift rates would have to far exceed those previously reported from San Pedro to raise Crickmay's zone 2 sediments above sea-level in so short a period of time. Although none of these lines of reasoning are conclusive, they do tend to favor the older Pliocene age. Each is discussed further below.

Other occurrences - Occurrences of *A. gibbera* in the Niguel and Towsley formations discussed above are late Pliocene in age. In addition, Woodring (1938) reports *A. gibbera* from Sixth and Lucas Streets, Los Angeles, and the Inglewood, Montebello, and West Coyote oil fields. All of these occurrences were assigned to the Pliocene by Woodring (1938).

Water depth - On Deadman Island, *A. gibbera* is found with *L. annulata* and probably *L. aequizonatum*. Living *L. annulata* occurs in water depths from 25 to 750 m (Scott, 1998), while living *L. aequizonatum* have been reported in water depths from 400 to 813 m (Coan et al., 2000; data herein). *Archivesica gibbera* is extinct, but no living eastern Pacific vesicomyids has been found shallower than 370 m (Coan et al., 2000), and most occur deeper than 500 m. Together, these species indicate a probable water depth between at least 370 and 750 m. The deepest water depth reported for a Pleistocene fauna in southern California is approximately 180 m (about 100 fathoms) for the Timms Point Silt (i.e., Valentine, 1961). Therefore, water depth estimates for Crickmay's (1929b) zone 2 on Deadman Island are nearly twice that reported for any Pleistocene deposit in the Los Angeles Basin, but are similar to those determined for several Pliocene faunas in the Los Angeles Basin (Woodring, 1938; Winterer & Durham, 1962; Mount, 1971; Vedder, 1972; Kern & Wicander, 1974; Davis, 1998).

Uplift rates - The Timms Point Silt has been assigned a middle Pleistocene age of 500 to 200 ka (Ponti, 1989; Lajoie et al., 1991). If zone 2 on Deadman Island is concordant with the Timms Point Silt we have to account for at least 370 m of uplift since the middle Pleistocene and also explain why uplift rates have decreased significantly in the past 125 ka (see Lajoie et al., 1991; Muhs et al., 1992[1993]; Muhs et al., 2002; Muhs et al.,

2006; Powell & Ponti, 2007). A better alternative is to assume uplift rates have been fairly constant and zone 2 is Pliocene.

Conclusions

The association of vesicomyids and *Lucinoma* is recognized in the Pliocene in southern California and interpreted to represent deep-water conditions in excess of 370 m at or near sulfide rich habitats. Fossil occurrences of vesicomyids in southern California younger than Pliocene are unlikely because uplift rates are not sufficient to expose deep-water deposits from younger ages.

Acknowledgments

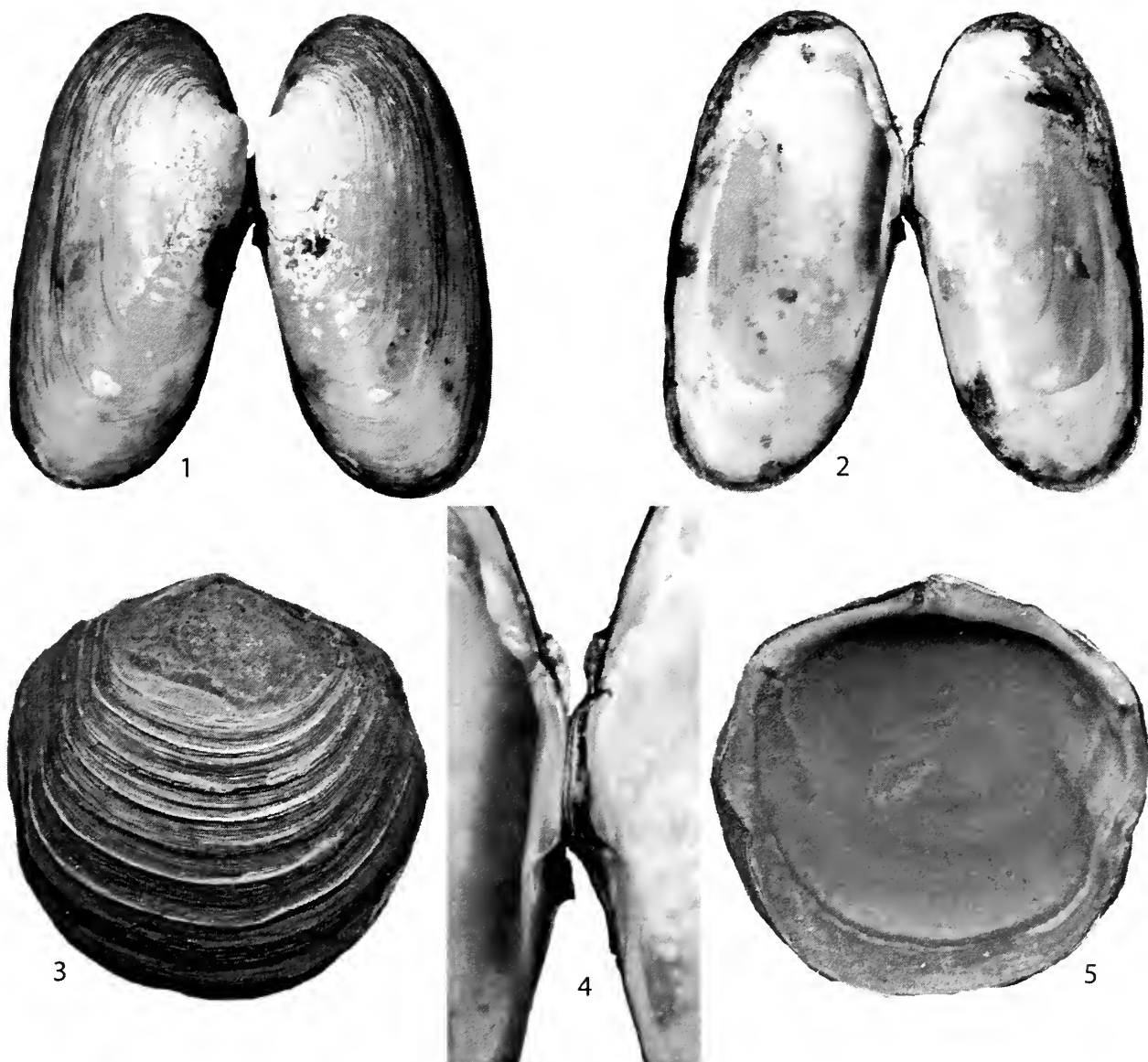
We thank Brian D. Edwards (U.S. Geological Survey [USGS], Menlo Park, California); Homa J. Lee (USGS, Menlo Park, California); and William R. Normark (USGS, Menlo Park, California) for making the Santa Monica Bay specimens available for study; also James P. Barry (Monterey Bay Aquarium Research Institution) helped in the modern *Vesicomya* identification. James P. Barry (MBARI), Larry A. Beyer (USGS, Menlo Park, California), Mary L. McGann (USGS, Menlo Park, California), Daniel J. Ponti (USGS, Menlo Park, California), Gerrat J. Vermeij (University of California, Davis), and several anonymous reviewers are thanked for their helpful comments.

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Figures 1-5. Figures 1, 2, 4. *Adulomya elongata* (Dall, 1916), USNM hypotype 110615. Height of right valve 33.3 mm, maximum width of both valves 34.4 mm (by caliper). 1. valves exterior, 2. valves interior, 4. close up of hinge. Sample number: USGS Marine Geology Leg 1035C, core H, section Pl, top of core, 0 cm. Collected from top of mud volcano, outer Santa Monica Bay, Los Angeles County, southern California. Figures 3, 5. *Lucinoma aequizonatum* (Stearns, 1890), USNM hypotype 110618. Height 35.2 mm, width 36.5 mm (by caliper). 3. valve exterior, 5. valve interior. Sample number: USGS Marine Geology HC1N1-Pl-0-62. Collected from top of mud volcano, outer Santa Monica Bay, Los Angeles County, southern California.

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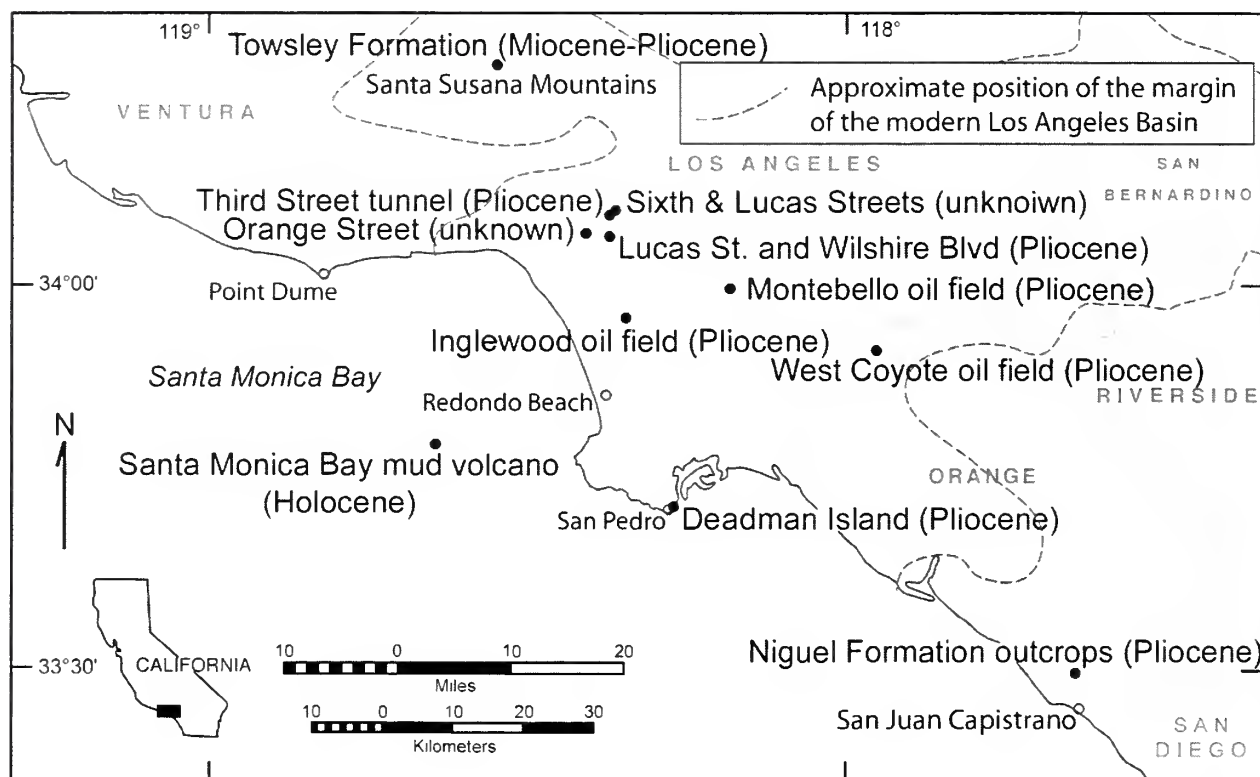


Figure 6. Map showing the greater Los Angeles Basin of southern California with localities where vesicomyids (closed circles) have been found, and locations mentioned in the text (open circles).

BOOK NEWS

Seashells of Southern Florida: Living Marine Mollusks of the Florida Keys and Adjacent Regions. Bivalves

By Paula M. Mikkelsen and Rüdiger Bieler, 2008

Princeton University Press, ISBN-13 978-0-691-116068

503 pages + viii, over 1,500 full color photographs and drawings

Price: \$85.00

Order information: <http://press.princeton.edu/titles/8484.html>

Perhaps only a few times in a lifetime does a book of this magnitude make it to our shelves. I remember well when *Sea Shells of Tropical West America* (Keen, 1971) was published, or the second edition *American Seashells* (Abbott, 1974). More recent works at this level include *Bivalved Seashells of the Red Sea* (Oliver, 1992) and *Marine Mollusks in Japan* (Okutani, 2000). These books are so rich in content and quality that they have affected our professional and hobbyist lives profoundly. I predict *Seashells of Southern Florida* by Mikkelsen and Bieler will similarly find its way to malacological and conchological bookshelves as an indispensable guide to the bivalve mollusks of Florida and beyond.

The goal of the authors is to "...showcase the enormous diversity of bivalves – in form, function, and lineages...", an admirable but incredibly difficult objective. This review will use this goal as the metric for success.

A surprisingly small introductory chapter guides readers through the Florida Keys' natural history and environs. The theme of habitat protection is strongly advocated. While mostly self-explanatory, a section on how to use the book is included. This does bare review, as some of the habitat icons, presented here, are confusing (e.g. the "abundant" icon looks a bit like a snowstorm; obviously not something one encounters in southern Florida).

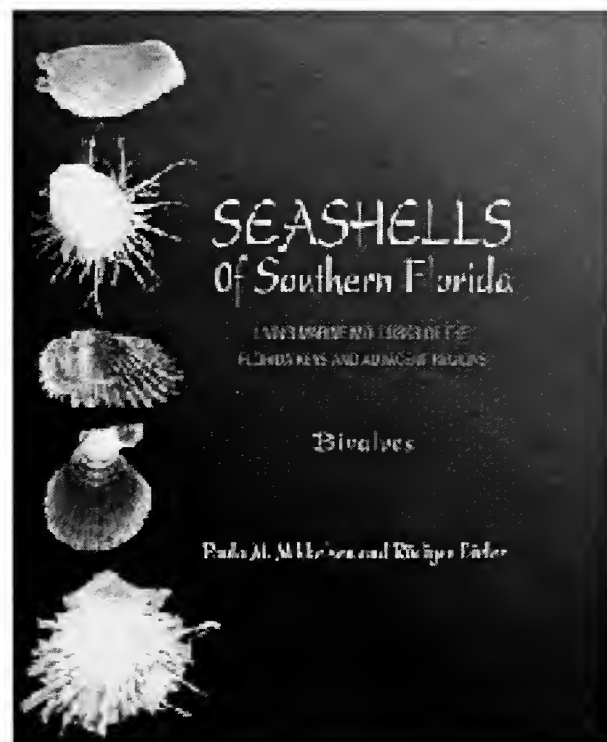
Chapters on bivalve morphology and classification are similarly brief, albeit a nice synopsis of the topics. The Florida bivalve families are placed into the perspective of the current widely fluctuating higher level classification of the global Bivalvia.

With this brief preamble, on page 24 the authors jump into the corpus of the book, bivalve descriptions, illustrations and diagnosis. Each chapter contains a single family, with each family in an implied context with a higher level classification. Each family begins with a "Featured Species" whereby the species is illustrated with a concise description of the shell and the species habitat and geographic distribution. Detailed shell and anatomical

descriptions of each family are presented along with fantastic new drawings of the family's general anatomy and the bivalve hinge. General bibliographic references for each family are found near the end of the chapter.

At the family section conclusion is a photograph or illustration of each species encountered in southern Florida along with a brief description and geographic range. Habitat and abundance information is presented with non-intuitive icons, but one can master them after a few uses (the key to the icons is on page 9).

The authors include "micro-bivalve" families and, in general, these are well described and illustrated. A few families include excellent SEM images, in a sepia tone, which greatly assist in delineating important characters in small bivalves. In some cases photographs



and illustrations are mixed on the same plate (e.g. Nuculanidae), making a quick visual diagnosis difficult.

In larger families, like the Veneridae, the chapter format can be a bit more cumbersome. The images assist in identification of specimens at hand, but there is no easy way to tell if you have a *Pitar* or a *Transennella*. Complex hinge formulas are given, but there is no illustrated key to formulas.

Certainly one of my favorite sections of the book is the illustrated glossary. Again, many original illustrations illuminate the most difficult terms. This unique glossary, potentially, can quickly turn a novice into an enthusiastic veteran.

Taxonomic names, common names, characters, anatomical features are all fully indexed.

If there is one area in which the book falls short, it is with some of the photographs. So many bivalves are "small white shells" and exceedingly difficult to photograph. One needs to see the hinge teeth, pallial line and adductor muscle scars in one image. While most of the external shell images are excellent, many of the internal images have no clear views of the hinge teeth and other internal shell features. Be that as it may, the authors certainly meet their goal of showcasing the diversity of marine bivalves, both visually and verbally.

All marine bivalve enthusiasts should purchase this book, regardless of their home port. The anatomical drawings, illustrated glossary and good photographs will be useful worldwide. In addition, I would strongly recommend this book to all malacologists and shell collectors. It just might entice them to take the plunge into the exciting, if not tumultuous, world of bivalve taxonomy.

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Santa Barbara Museum of Natural History



THE FESTIVUS

A publication of the San Diego Shell Club

Volume: XL

June 12, 2008

Number: 6

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c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111, USA.

The *Festivus* is published monthly except December.
The publication date appears on the masthead above.
Single copies of this issue: \$5.00 plus postage.

Meeting date; third Thursday, 7:30 PM
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PROGRAM

MARINE MOLLUSKS OF CABRILLO NATIONAL MONUMENT: SUCSESSES AND FAILURES IN AN URBAN ENVIRONMENT

Benjamin Pister, Club member and Park Biologist at the
Cabrillo Monument, will give an illustrated program on

the Monument and many of its mollusks and discuss the
pressures on conservation in southern California.

and

Mini-auction of books
Meeting date: June 19, 2008

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CLUB NEWS

Minutes of the San Diego Shell Club Meeting 15 May 2008

The May meeting was well attended with a great deal of interested discussion prior to the opening of the business meeting regarding the identification of various shells from Mission Bay brought in by Nancy and Bill Schneider.

Jules Hertz called the meeting to order at 7:40 pm. Guests were introduced and the March minutes were approved without change by the membership attending. The treasurer was not present so there was no report. Jules reminded the members to send their checks for shells purchased at the auction to the treasurer, Silvana Vollero.

Carole Hertz introduced the speakers, John LaGrange and Paul Tuskes. John began the presentation with a review of external clam morphology, accompanied by excellent pictures, and proceeded to review biological and taxonomic information for many of the Mission Bay clams – including how they tasted!!

When John finished his very informative presentation, there was an optional quiz directed by Paul Tuskes that involved identifying six local clams that had been illustrated and discussed. The winner, Carole Hertz received a shell prize. Next was a photo quiz of six live snails which were quite difficult to identify since the shell was not visible. This second shell prize was won by Nancy Schneider.

Paul then showed underwater slides and an exciting little video of assorted invertebrates, including Mission Bay nudibranchs, live *Anadara*, and *Trachycardium* clams. He also reviewed some of his findings on *Neosimnia* in Mission Bay. The presentation was terrific, a big hit with all attending.

A thank you to John Bishop and Debbie Catarius for bringing in the tasty refreshments.

Paul Tuskes (with comments by the editor)

Recent Donations to The San Diego Shell Club

The Club is very fortunate to have very generous members who donate to benefit the Club. This month the Club was the recipient of sizeable gifts from two of our long-time members, Margaret Mulliner and Carol Skoglund.

The Club was given 47 books from the Margaret Mulliner library. Many are outstanding volumes, some of which will be placed in the Club library. Others will be saved for future Club auctions and the remaining books will be sold at mini-auctions or sales tables at regular Club meetings.

Carol Skoglund who was recently here from Phoenix, Arizona, brought some very fine shells from a collection which she had received. Her donation will provide some additional beautiful shells to entice our big buyers at the next auction – and, perhaps, the auction after that.

Our grateful thanks to both Carol and Margaret for their generous donations.

The Club Website Has a New Address

Have you looked at the Club's new website lately? Thanks to new Web Manager Bob Dees, the Club's website looks beautiful and classy – filled with color, shells, and more information than ever before. There are listings of monthly titles from *The Festivus* and a page of links to many worthwhile institutions and web sites.

And it's still growing! The new address is <http://sandiegoshellclub.com>. The old out-of-date web site is still on Google, but will hopefully be deleted soon. You can reach the new one by entering the new address on the "search" area at the top of the page.

THE MANY-RIBBED ARK CLAM, *ANADARA MULTICOSTATA*, IN MISSION BAY, SAN DIEGO, CALIFORNIA

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In June of 2007, while returning from making observations on the bubble snail *Haminoea virescens* (Sowerby, 1833), I was snorkeling past an area disturbed by bat rays. On either side of a large bat ray feeding depression were two moderate-sized live clams that I did not recognize. Both clams had a thick black periostracum that covered all but the oldest growth, and numerous deep radial ribs extending from the beak to the ventral margin. The specimens measured approximately 80 mm in length x 68 mm in height and 60 mm thick. Large specimens from Mission Bay are in the range of 110 mm x 100 mm, and 85 mm thick (Figure 1).

Upon contact, Paul Valentich-Scott at the Santa Barbara Museum of Natural History (SBMNH) made arrangements for me to examine material in the collection, which allowed me to confirm the identification as *Anadara multicostata* (Sowerby, 1833). This is the second species of *Anadara* to be reported from Mission Bay. I was able to examine the specimen of *Anadara tuberculosa* (Sowerby, 1833) deposited by Jules and Carole Hertz at SBMNH, and later, the specimen in their personal collection. Both specimens were collected at Ski Beach on Vacation Isle, in Mission Bay, San Diego, California, in December 1991. The specimen in the Hertz collection is illustrated (Figure 2) for comparison with *A. multicostata*. The two species are superficially similar, but the valves of *A. multicostata* are more inflated, stout, and angular compared to those of *A. tuberculosa*. Both *Anadara* species are associated with the Panamic fauna to the south and seldom collected in southern California. One lot of two specimens of *Anadara multicostata* from Mission Bay were deposited in the collection of the Santa Barbara Museum of Natural History (SBMNH 83443).

Anadara multicostata, in the family Arcidae (Arc Shells), is listed in the fisheries literature as the mangrove cockle. Its habitat in Mission Bay is consistent with its preferred habitat in Baja California, México. I

observed numerous dead specimens of *Anadara multicostata* in the cleaned and discarded piles of clam and pecten shells at Guerrero Negro during January 2008. Guerrero Negro is on the west coast of Baja California, México, and approximately 350 air miles south of San Diego, California. *Anadara multicostata* is rarely reported from southern California. Its reported distribution is from Baja California Sur, and the Golfo de California south to the Islas Galápagos, Ecuador (Coan et al., 2000).

Other unique species from the Golfo de California that have been collected live, in limited numbers in southern California include: the large murex *Muricanthus nigrinus* by Farmer (1987), *Cymatium gibbosum* by Catarius (1988), and bivalves such as *Anadara tuberculosa* by Hertz & Hertz (1992), *Nodipecten subnodosus* by Hinton (1985), *Laevicardium elatum* by Morris (1969) and *Pteria sterna* by Coan et al. (2000). *Pteria sterna*, is currently present in Mission Bay, but uncommon.

Since the initial find, I have observed dozens of *A. multicostata* while snorkeling or SCUBA diving in Mission Bay. Live individuals have been found in Bonita, Ventura, and Santa Barbara coves, each of these coves are off the main Mission Bay channel. The large number of individuals in numerous locations, suggests the species is currently well-established. Perhaps due to the lack of notable wave action within the bay and the size and weight of the shell, specimens are not washed on to the beach, nor are other large specimen shells found in the same habitat, such as the moon snail *Polinices lewisii*.

The clams occur in soft sand or silt substrate that does not receive strong tidal currents. This species of *Anadara* occurs both in the exposed sand, silt patches, and among moderately dense stands of eel grass. In late October, a live specimen was collected in a similar eel grass habitat at Ski Beach, on the east side of Vacation Isle, Mission Bay, by Carole Hertz (pers. comm.), and John LaGrange found a specimen in South Cove, also

on Vacation Isle (pers. comm.). Based on these observations, I would expect this species to occupy a similar habitat throughout Mission Bay. As yet, no live specimens or dead shells have been found in the Mission Bay Channel; the high tidal currents and hard sand bottom are in sharp contrast to their preferred habitat in sediment or soft sand.

During a typical one-hour dive, three to four live/dead *Anadara* are normally seen and Larry Catarius, (pers. comm.) estimates a similar level of abundance. The depth range varies from approximately minus 2 to 14 feet. The number of *Anadara* overlooked or buried must be substantially higher. None of the dead clams showed signs of damage by bat rays, nor have they been drilled, and large starfish such as *Pisaster* are not present in the sand. Remains of moderate-sized (less than 80 mm) individuals are found in the debris fields outside of octopus dens.

The hinge ligament is very robust, such that, finding only half of the dead bivalve is uncommon. The durability of the hinge makes it the only clam in Mission Bay commonly used by the octopus sp. as both shelter and mobile home. When the octopus occupies shells of this species, it typically holds half of a San Diego Bay scallop, *Argopecten ventricosus* (Sowerby, 1842) across the opening, which shields the body of the octopus (Figure 3).

When the clam is burrowing, the ventral margin of

the shell is down, and the hinge area vertical (Figure 4). In this position, they can be mistaken for *Trachycardium quadragenarium*. When they move into the feeding position, the clam rotates. The ventral margin projects most commonly from one to three cm above the sand (Figure 5) and the valves open about 1 cm while feeding. On occasion, nearly the entire clam is exposed while feeding.

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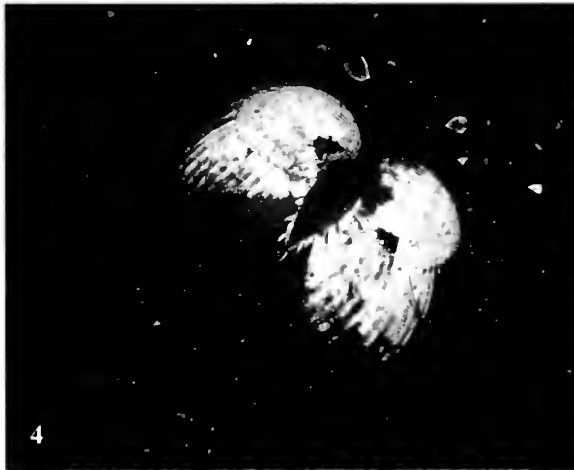
Figures 1-5. (1) *Anadara multicostata* with periostracum partly removed to show details of valve. (2) *Anadara tuberculosa* from Mission Bay, December 1991. Hertz Collection (3) *Anadara multicostata* used as an octopus den. (4) *Anadara multicostata* burrowing in sediment. Burrowing position. (5) *Anadara multicostata* oriented in feeding position, but valves not open. →



1



2



4



5



3

FIRST RECORD OF THE EUROPEAN LAND SNAIL
TROCHULUS STRIOLATUS IN BRITISH COLUMBIA, CANADA
(PULMONATA: HYGROMIIDAE)

ROBERT G. FORSYTH¹

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Abstract: The European terrestrial snail *Trochulus striolatus* (C. Pfeiffer, 1828), found at one locality in the city of Revelstoke, is newly reported from British Columbia, Canada. This record appears to be the first time that this species has been found in western North America.

Trochulus striolatus (C. Pfeiffer, 1828) is one of two species of *Trochulus*, family Hygromiidae, that are introduced to North America. This genus is better known by the name *Trichia*, but a ruling by the ICZN (2004) has resulted in replacing *Trichia* Hartmann, 1840, with *Trochulus* Chemnitz, 1786, so as to remove homonymy with *Trichia* de Haan, 1839 (Crustacea: Brachyura). In Europe *Trochulus striolatus* has an expansive range that includes the British Isles, northern France, the Netherlands, northern Switzerland, southern Germany, and extends eastward to Hungary and Slovakia (Kerney et al., 1983). Populations are discontinuous and subspecies are recognized by some authors (e.g. Falkner et al., 2002).

Both *Trochulus striolatus* and *T. hispidus* (Linnaeus, 1758) have long been known in North America, but until now only in eastern and central Canada and the northeast United States. In Canada, *Trochulus striolatus* is known from Quebec and Ontario, Nova Scotia and Newfoundland (Pilsbry, 1939; Brooks & Brooks, 1940; Dundee, 1974). In the U.S., Pilsbry (1939) recorded it from Massachusetts and Dundee (1974) from New York. The new record, the first from British Columbia, is also likely the first report of *T. striolatus* from western North America.

The following new record was found by chance during a brief stop along the Trans-Canada Highway in British Columbia in the autumn of 2007.

Canada: British Columbia: Columbia-Shuswap Regional District: Revelstoke: Big Eddy: Trans-Canada Highway (Hwy 1), rest area near W end of the Columbia River Bridge. 51° 00' 16" N, 118° 13' 29" W (WGS84 datum). Elevation ca 420 m. Leg. R. Forsyth and T. Forsyth, 17 October 2007 (Forsyth Collection, 07.183.881, 15 specimens).

The Big Eddy site is along the Columbia River, at a highway pullout in the City of Revelstoke. The land is low but probably not frequently flooded. Large black cottonwoods (*Populus balsamifera* ssp. *trichocarpa*) provide the tree cover and there is a well-developed understory of shrubs, including mountain-ash (*Sorbus* sp.). Among the terrestrial snails collected with *T. striolatus*, there were a mixture of native and introduced species: *Allogona ptychophora* (Brown, 1870), *Cochlicopa lubrica* (Müller, 1774), *Columella edentula* (Draparnaud, 1805), *Discus whitneyi* (Newcomb, 1864), *Nesovitrea binneyana* (Morse, 1864), *Oxychilus cellarius* (Müller, 1774), *Punctum randolphii* (Dall, 1895), and *Vitrina pellucida* (Müller, 1774). Very young *Arion*, of an indeterminate species, were also observed. Due to time limitations, no other effort was made to search nearby localities for the species, but during an earlier visit to the same site in July 1998, *Trochulus striolatus* was not found. At that time only three species were collected (*Cochlicopa lubrica*, *Discus whitneyi* and *Allogona ptychophora*), and it seems likely

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that this earlier collecting effort was less thorough or that the conditions for finding snails were not optimum. It could be possible that *Trochulus striolatus* was present but went undiscovered at that time.

In Britain this is a common species on waste ground, along roadsides, the edges of fields and woods, in quarries, under walls and in gardens, and living in semi-natural and old woods only in southern England (Kerney 1999). *Trochulus striolatus* is very common in southeastern Ontario in similar disturbed habitats; large quantities of shells are present in stream drift.

Trochulus striolatus (Figure 1) is unlikely to be confused with other, native or introduced snails in British Columbia. Among the species present at the Big Eddy locality, it is most similar to young of *Allogona ptychophora*. Shells of juvenile *Allogona* differ in having a much narrower umbilicus and a thin lip without the internal basal rib, and the mantle has large dark blotches that can be seen through the shell. *Allogona* and other genera of the family Polygyridae, such as the medium-sized *Vespericola columbianus*, have a strongly flared or recurved aperture lip when adult. *Trochulus striolatus* belongs to the speciose family Hygromiidae; there are no other hygromiids known to be introduced into British Columbia.

The shell is thin, translucent, heliciform, with a low conical spire; it is medium-sized, 11 mm wide,

coarsely striate, and horn-brown with a pale band at the weakly angular periphery. The umbilicus is small, about 1/5 of the width of the shell. The lip of the aperture is slightly expanded basally and near the umbilicus. Behind the inner edge of the palatal lip there is a narrow rib that is strongest basally.

It is unclear what subspecies the snails from British Columbia may belong to.

The shell of *Trochulus striolatus* is similar to *T. hispidus* but always lacks periostracal hairs in adults; it is slightly larger and has a weak peripheral angulation marked by a faint, slightly more opaque, whitish band. There are other European species of *Trochulus*, but none of these are known to be introduced to North America.

With the addition of *Trochulus striolatus* to the list of terrestrial gastropods in British Columbia, there are now 14 introduced snails and 14 slugs recorded (Forsyth 1999, 2004; Forsyth *et al.* 2001 and unpublished). These represent slightly less than 30% of the total 96 species known to live in British Columbia.

Acknowledgments

For their comments on the manuscript, I thank Dr. Frederick W. Schueler, Bishops Mills Natural History Centre, Bishops Mills, Ontario, and an anonymous reviewer.



Figure 1. Apical, lateral and basal views of a shell of *Trochulus striolatus* from Big Eddy, Revelstoke, British Columbia; Forsyth collection, cat. no. 07.183.881. Width of shell: 11.3 mm.

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Mission Bay Survey Project – Selected Tides for 2008

The approximate time of (daytime) low tides are listed in the table below, along with suggested locations so that our effort will result in representative sampling of the bay. Some of the best tides fall on working days but are still listed. We suggest that you call a friend or two for some shell collecting. Remember, if you are taking live material, a California salt water fishing license is required. Please send your data via mail or e-mail to Paul Tuskes. Good Luck John & Paul.

Month	Date	Time	Tide Level	Suggested Locations
June	6 th Friday	6:18 AM	-1.5	Fiesta Island [Hidden Anchorage, Enchanted Cove, or Pacific Passage] – sand, silt, eel grass habitats
June	7 th Saturday	7:10 AM	-1.1	
June	8 th Sunday	8:02 AM	-0.5	
July	4 th Friday	5:12 AM	-1.7	North Mission Bay [Sail Cove, Crown Point or De Anza Cove] – sand, eel grass habitats
July	5 th Saturday	6:36 AM	-0.8	
July	6 th Sunday	7:16 AM	-0.2	
October	26 th Sunday	1:52 PM	+0.2	Your favorite location – take a friend
October	27 th Monday	2:19 PM	-0.1	
October	28 th Tuesday	2:45 PM	-0.3	
November	12 th Wednesday	2:30 PM	-1.2	Quivira Basin – rock and possibly some exposed sand
November	13 th Thursday	3:16 PM	-1.4	
November	14 th Friday	4:00 PM	-1.5	
December	13 th Friday	3:13 PM	-1.9	Mission Point – sand and rock in cove, rock on channel side
December	14 th Saturday	4:00 PM	-1.9	
December	26 th Friday	3:06 PM	-0.8	Any location – take a friend
December	27 th Saturday	3:37 PM	-0.8	
December	28 th Sunday	4:08 PM	-0.8	

REMEMBERING THE BRADNERS¹

With sadness we report the passing this year of two longtime members of the San Diego Shell Club, Hugh and Marge Bradner. Marge (Marjorie Hall Bradner), passed away on April 10th and was followed shortly by Hugh on May 5th at the age of 92. They will be sorely missed. Hugh, better known to Club members as Brad, had an illustrious career in science in addition to his many contributions to The San Diego Shell Club. As John Learned, a professor of physics at the University of Hawaii stated, "He was always up to 17 different things." He was a renowned physicist affiliated with Scripps Institution of Oceanography since 1961, joining Scripps as a research geophysicist in the Institute of Geophysics and Planetary Physics and becoming a professor in 1964. He served as acting provost of UC San Diego's Revelle College during 1966-1967 and remained at Scripps and UCSD until his retirement in 1980. Brad published extensively in the fields of physics, seismology, geophysics and diving. He also was co-author of a monograph on the radulae of the Cypraeidae [see p. 80], thus combining his scientific and malacological interests. He was a member of the DUMAND (Deep Muon and Neutrino Detection) Steering Committee and professor emeritus at Scripps incorporating science and ocean exploration.

During his distinguished career as a nuclear physicist, Hugh Bradner worked at the U.S. Naval Ordnance Laboratory in Washington D.C. and the Lawrence Radiation Laboratory at UC Berkeley. He was one of the founding scientists of the Los Alamos National Laboratory working on the Manhattan Project. It was at Los Alamos that he met Marjorie Hall, his wife of 65 years. They were active in the San Diego Shell Club, hosting the Club's annual auctions at their home for many years.

Brad had a lifelong passion for the ocean and as Walter Munk of Scripps said, "He wanted to be in closer contact with the real world... [and] spent a lot of time at sea." He enjoyed diving and sailing and was one of the first Americans to make a deep-water SCUBA dive. In 1951, while working at UC Berkeley, he de-

cided to spend some "weekend time" improving diving equipment for navy frogmen, which began his pioneering research on the wetsuit. Brad focused on the design of a wet suit for military underwater swimmers and developed the first neoprene wetsuit. "Brad's neoprene wetsuit was a tremendous contribution to scientific diving," said James Stewart, professor emeritus at Scripps. "He was a great guy and a lot of fun to work with." But Brad, believing in collaborative science, was reluctant to claim himself as sole inventor of the wetsuit. He also invented other diving equipment, including underwater contact lenses, a single-hose regulator and a decompression meter. Hugh even developed a loop system for quickly extracting U.S. Navy SEALs from the water via inflatable boats.

Among his formidable scientific pursuits and cultural activities, Brad and Marge found time to be active members of the San Diego Shell Club from 1975 to 2004. Hugh served as Vice President in 1976 and President the following year. He published 18 papers in *The Festivus* as sole author and with co-authors – one with Marge. Marge also wrote five articles for *The Festivus* [see p. 80].

Brad's most important work was on his favorite molluscan group, the Cypraeidae. With Alison Kay of the University of Hawaii as co-author, he wrote the 180-page, *An Atlas of Cowrie Radulae (Mollusca: Gastropoda: Cypraeoidea; Cypraeidae)* with 238 figures of cypraeid radulae which was published as a Supplement to *The Festivus* in 1996. Memories abound of Brad begging cowries with animals for his radular studies and of visits to his home office scattered with miles of paper of his illustrations of cowry radulae.

Brad and Marge are survived by a daughter, Bari Bradner Cornet of Berkeley, California, three grandchildren and a great granddaughter. The family requests gifts in their memory to The Hugh and Marjorie Bradner Endowment at Scripps Institution of Oceanography. A memorial service for Hugh and Marjorie Bradner will be held at Scripps Institution of Oceanography at a later date.

¹ With excerpts from *Marine Technology Reporter* dated 14 May 2008 and *The San Diego Union-Tribune* dated 18 May 2008.

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Carole M. Hertz, editor
The Festivus



THE FESTIVUS

A publication of the San Diego Shell Club

ISSN 0738-9388

Volume: XL

July 10, 2008

Number: 7

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Overseas (air mail):\$30.00; Mexico/Canada (air mail):\$20.00.

Address all correspondence to the San Diego Shell Club, Inc., c/o
3883 Mt. Blackburn Ave., San Diego, CA 92111, USA.

The Festivus is published monthly except December.
The publication date appears on the masthead above.
Single copies of this issue: \$5.00 plus postage.

Meeting date: third Thursday, 7:30 PM,
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PROGRAM

A VISIT TO PITCAIRN AND HENDERSON ISLANDS

Don Pisor, club member and shell aficionado, will
present a PowerPoint program on his most recent

adventure to remote Pitcairn and Henderson islands with
club member John "Duffy" Daughenbaugh.

and

Amabelle June Aguelo, 2008 - Club Science Fair
winner, presents an overview of her winning project

entitled, "Effect of pesticides on the fertilization rate of
Strongylocentrotus purpuratus.

Meeting date: July 17, 2008

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CLUB NEWS

Minutes of the San Diego Shell Club Meeting 19 June 2008

The meeting was called to order by Jules Hertz at 7:45 pm. Minutes of the previous meeting, as published in *The Festivus*, were approved and accepted by the members. The treasurer was not present so there was no report.

Carole Hertz, introduced the speaker, Benjamin Pister. The speaker received his PhD in Marine Ecology from Scripps Institution of Oceanography and is the current biologist at Cabrillo National Park on Point Loma. Benjamin discussed the relationship of the site to San Diego and indicated that the Park receives nearly a million visitors each year. Currently the Park is divided into three areas, with one of the three areas having restricted access and the other two open to the public. There is no collecting in the Park. Studies have shown that the addition of trained volunteers not only help guide and educate visitors, but they play an important role in the preservation of the site.

Approximately 160+ species of mollusks have been identified on the site. Benjamin discussed some of the species and had a nice collection of excellent photos illustrating many of the shelled snails and nudibranchs. Of particular interest was the status of the Giant Owl Limpet, *Lottia gigantea*, which can reach 90+ mm in the preserve and he reported the species exceeding 120 mm on some of the offshore islands. Currently, no abalone species are found in the intertidal zone in the Park.

Following the presentation there was a mini-book auction and the shell drawing was won by Heather Crumley. The meeting was adjourned at approximately 8:40 pm. and members and guests enjoyed refreshments provided by John LaGrange and Marty Schuler.

Paul Tuskes

The Club's Annual September Party Save the Date

Once again Debbie and Larry Catarius have generously offered their garden for the Club's annual September party. It will be held on Saturday afternoon September 13th beginning at 4 pm. A sign-upsheet for the potluck will be passed around at the July and August meetings. This is always an enjoyable party – plan to attend.

2008 R. T. Abbott Visiting Curatorship

The Bailey-Matthews Shell Museum invites applications for the 2008 R. T. Abbott Visiting Curatorship which was established in accordance with the wishes of the late Dr. Abbott, Founding Director of the Shell Museum. "The curatorship is awarded annually to enable malacologists to visit the museum for a period of one week. Abbott Fellows are expected, by performing collection-based research, to assist with the curation of portions of the Museum's collection and to provide one evening talk for the general public. The Museum collection consists of marine, freshwater and terrestrial specimens. A large percentage of our holdings have been catalogued through a computerized database management system, part of the catalogue is already available for searches online at: www.shellmuseum.org/collection.html A substantial portion of the time will be available for research in the collection, but field work in southwest Florida can be arranged. The R. T. Abbott Visiting Curatorship is accompanied by a stipend of \$1,500.

Interested malacologists are invited to send a copy of their curriculum vitae together with a letter detailing their areas of taxonomic expertise and research objectives, and to provide a tentative subject for their talk. Send material to:"

Dr. José H. Leal, Director, The Bailey-Matthews Shell Museum, P.O. Box 1580, Sanibel, FL 33957
jleal@shellmuseum.org

Applications for the 2008 Curatorship should be sent electronically to the above e-mail address no later than May 15, 2008. The award will be announced by mid-June 2008.

Additions and Changes to the Roster

New Members

Crumley, Ric and Heather 1222 Elkelton Blvd., Spring Valley, CA 91977. Phone: 619-466-7341. E-mail: KUMA@tcsd.com

Address Changes

California Academy of Sciences Library, Golden Gate Park, 55 Concourse Drive, San Francisco, CA 94118.

von Kriegelstein, Doug, 40372 Grand Ave., Cherry Valley, CA 92223. Phone: 951-922-9607.

Weber, Gladys (change of e-mail):
gladysweber93@yahoo.com

ON *TWO OPALIA* - LIKE EPITONIIDS (GASTROPODA: EPITONIIDAE) FROM THE GULF OF MEXICO

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E-mail: Efg2112@louisiana.edu

A number of epitoniid species are known for long oceanic travels, and some are well-documented in literature as inhabiting both sides of the Atlantic Ocean. It has been discovered rather recently that *Eccliseogyra formosissima* (Jeffreys, 1884), which was only known from off Portugal, Morocco and the Azores, inhabits hydrocarbon vent communities off Louisiana (García, 2003a); and *Gyroscala xenicima* (Melvill & Standen, 1903), a species whose geographical distribution was believed to be restricted to the Indo-Pacific, has been reported in the western Atlantic from Uruguay to the east coast of Florida and Texas (García, 2003b, 2006a, 2006b).

In a former issue of *The Festivus* (García, 2007) I published the results of deep-water dredging in the Gulf of Mexico using the Benthic Skimmer, a dredge uniquely designed for deep-water collecting. Among the species obtained in that expedition was an empty specimen of *Gregorioiscala pachya* (Locard, 1897) (Figures 1-3), a bathyal epitoniid species that had only been reported from southwestern Europe and the Azores. The genus *Gregorioiscala* Cossmann, 1912, is an *Opalia*-like group that inhabits deep water. Like the genus *Opalia*, it has a rather soft, pitted intritacalx, a chalky top layer that covers the shell, which is usually elaborately sculptured. Although *Gregorioiscala* was originally erected for a fossil taxon, de Boury (1913: 27), Cossmann (1912), and Bouchet & Warén (1986: 544) have placed in this genus Recent deep-water species with a relatively wide, concave basal disk with a strongly defined basal cord, and strong axial ribs, some of which may form varices. I have in the past followed these workers in treating *Gregorioiscala* as a genus distinct from *Opalia* (García, 2004); however, the differences are somewhat nebulous as no one character is unique to that genus.

Gregorioiscala pachya is a very distinct epitoniid species. The shell grows to at least 33 mm, is solid, lanceolate, with rather wide axial ribs, some of which

develop into thick varices that tend to be aligned from whorl to whorl; the very thick labral varix is conspicuously beveled, and the aperture is circular. This species also has a strong basal cord and a pronounced concave basal disk. The specimen of *Gregorioiscala pachya* from the Azores shown in Figure 6 is a syntype figured by Bouchet and Warén (1986, p. 545, fig. 1255). Its surface has a pitted intritacalx that is soft and easily eroded. The intritacalx of *G. pachya* specimens from Louisiana and from the Azores are shown in Figures 3 and 7 for comparison.

During a recent trip to southern Florida I had the opportunity to inspect the collection of Kevan and Linda Sunderland, and found a second specimen of *Gregorioiscala pachya*. It was dredged off Dry Tortugas, Florida, in 340 to 400 m, and measures 20 mm. This specimen was figured in *American Conchologist* 17(2): 14 as *Opalia watsoni* (de Boury, 1911), a much smaller species considered later in this study; and *Malacolog* (2005) lists the same specimen as *Punctiscala cerigottana* (Sturany, 1896) (Rosenberg, 2008). However, *P. cerigottana* (Figure 16) is also much smaller in size, lacks the aligned varical structure, and has a narrower basal disc. The intritacalx microstructures of *Gregorioiscala pachya* and *Punctiscala cerigottana* are also different (compare Figures 3, 7 and 16).

During my visit to southern Florida I also had the opportunity to study some specimens from the collection of Frank Frumar in Cudjoe Key, Florida Keys, and brought back with me an interesting epitoniid to look at it closely. This specimen happens to match another Frumar specimen, from a different lot but from the same locality, that I had borrowed and studied earlier; and both seem to be referable to *Punctiscala watsoni* (de Boury, 1911), a taxon that has been reported twice by Clench and Turner as inhabiting southern Florida. However, both times Clench and Turner's reports have been considered misidentifications, the first by the

authors themselves and the second by Bouchet and Warén. This will be explained below.

The genus *Punctiscala* de Boury, 1890, is another *Opalia*-like group very similar to *Gregorioiscala*. Bouchet and Warén chose to use de Boury's taxon for Recent epitoniid species because there are several species that look very similar to the type species *Scalaria plicosa* Philippi, 1844, a fossil; however, the authors state that the relationship between the two genera "is not clear," and that "it may be that these are only species groups within a broader genus" (1986: 548). *Punctiscala watsoni* was described from specimens obtained off Pernambuco, Brazil. Clench and Turner reported in 1950 to have found it in Florida and Cuba (Johnsonia 2:231); however, that species turned out to be an undescribed species later named by them *Opalia abbotti*. In the 1952 issue where *O. abbotti* was described, the authors published the description of a specimen dredged off Sand Key, Florida Keys, in approximately 230 m, that they identified again as *watsoni*. According to the authors, that specimen "agrees entirely with the description and figure given by Watson in the Challenger Report" (Johnsonia 2: 332). They point out the difference between the pitted sculpture of the intritacalx of *Opalia abbotti* (see Figure 14) and the reticulated sculpture of the intritacalx of *Punctiscala watsoni* (Figure 13). The authors' assertions notwithstanding, Bouchet and Warén subsequently determined that the Sand Key specimen was not *Punctiscala watsoni* but *P. cerigottana* (Sturany, 1896).

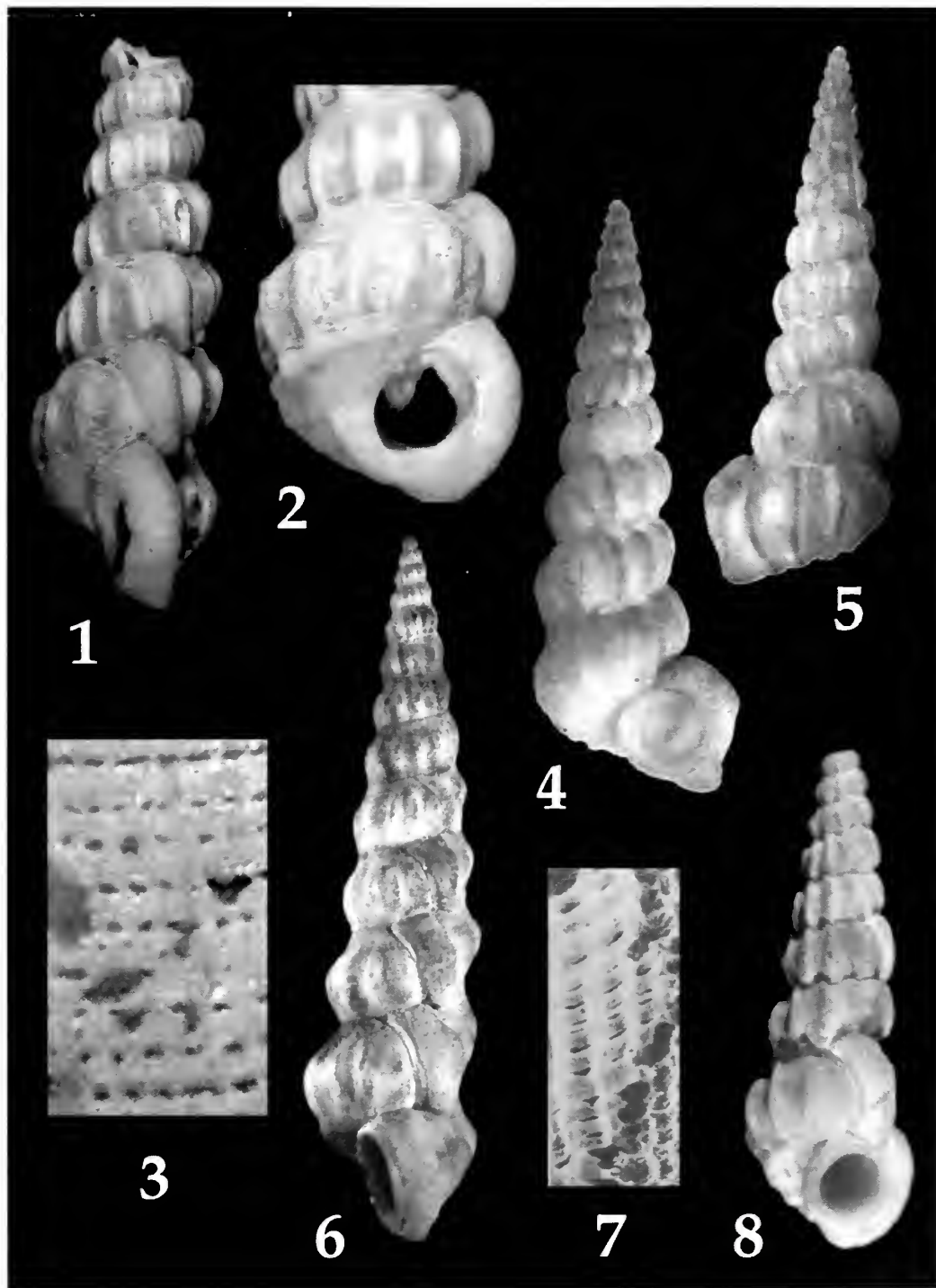
In discussing Clench and Turner's misidentification and the differences between *Punctiscala cerigottana* and *Scalaria finiculata* Watson, 1883, an objective synonym of *Punctiscala watsoni* (per Rosenberg, 2005), Bouchet and Warén state that *S. finiculata* "has fewer, more distant axial ribs, a much larger basal disc and a distinctly reticulate sculpture" (1986, p. 550). I have not examined the specimen described by Clench and Turner and, unfortunately, the figure that appears with the description (Johnsonia 2:332, pl. 160) seems to be that of the holotype of *Scalaria finiculata* Watson, 1883, as shown by Kaicher (1983, No. 3619), rather than that of the specimen discussed.

I have based my identification of Frumar's specimens (Figures 8, 9-12) on the fact that they clearly show a reticulate intritacalx that matches Watson's original drawing (compare Figures 12 and 13), and that differs from the sculpture of *P. cerigottana* (Figure 15).

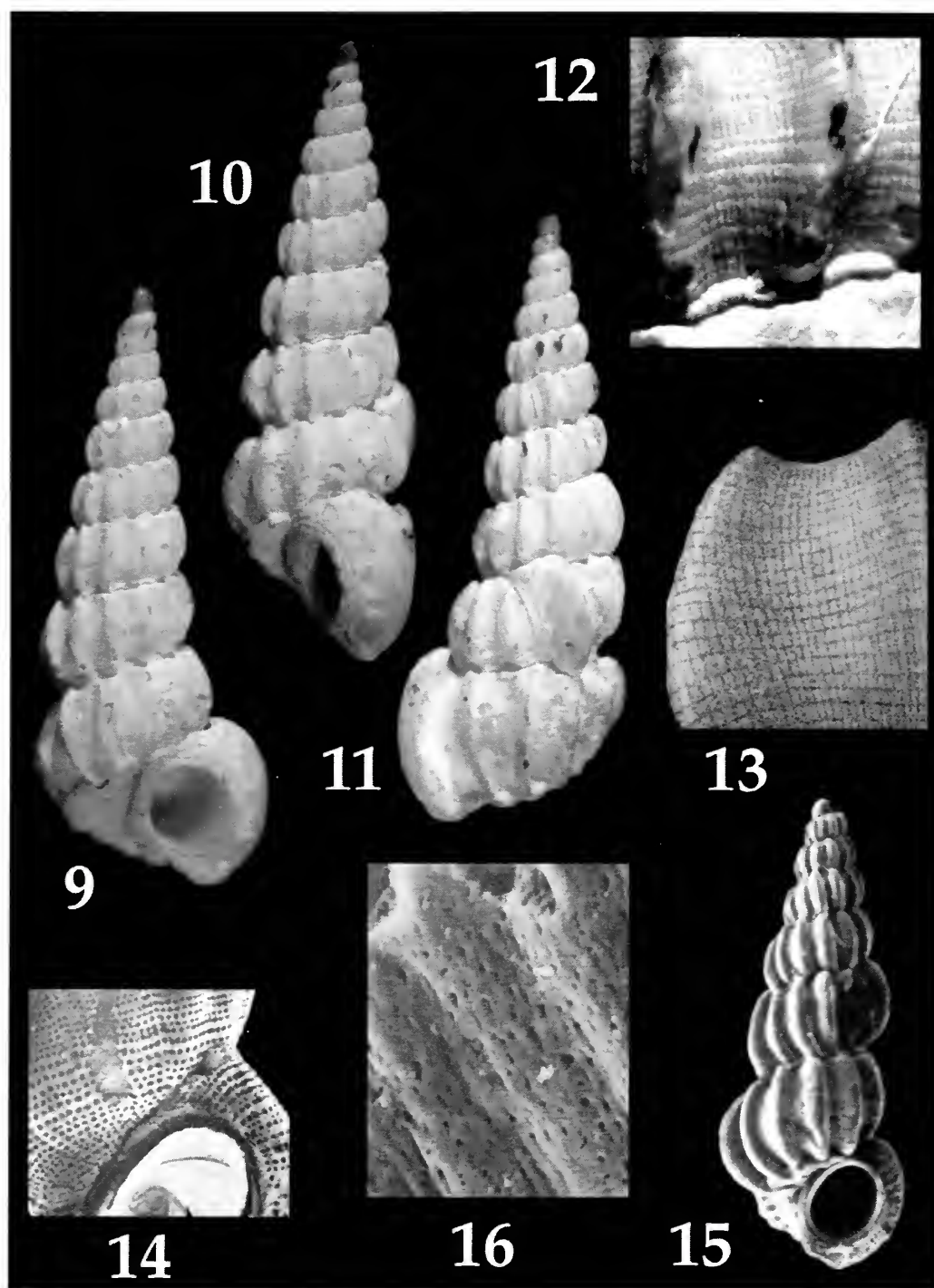
Frumar's specimens also have a wider basal disc than the latter, as well as fewer, more distant axial ribs (compare Figures 9 and 16). Coincidentally, Frumar's specimens and Clench and Turner's specimen were dredged in the same area at almost the same depth.

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Figures 1-8. (1-7) *Gregorioiscula pachya* (Locard, 1897). (1-3) Off Louisiana, 27°35' 22"N to 27°33' 13"N, 91°52' 31"W to 91°47' 55"W, in 600-960 m, 16 mm (EFG 27415) (3) Microsculpture of intritacalx. (4-5) Off Dry Tortugas, Florida, in 340- 400m, 20 mm (Sunderland coll.). (6) Syntype, *Talisman* dr. 127, 38°37'N, 28°21'W, 1258 m, 33 mm, after Bouchet & Warén (1986: 545, fig. 1255). (7) Microsculpture of intritacalx of Azores specimen, after Bouchet & Warén (1986: 476, fig. 1120). (8) *Punctiscula watsoni* (de Boury, 1911). Southwest of Key West, Florida, in 250 m, 10.3 mm (Frank Frumar coll.).



Figures 9-16. (9-13) *Punctiscala watsoni* (de Boury, 1911). Southwest of Key West, Florida, in 250 m, 7 mm (Frank Frumar coll.). (12) Microsculpture of intritacalx of 7 mm specimen (Frank Frumar coll.). (13) Microsculpture of intritacalx of *Scalaria funiculata* Watson, 1883 (= *Punctiscala watsoni*), Watson's original drawing reprinted by Clench & Turner (*Johnsonia* 2:334, pl. 161, fig. 4). (14) Microsculpture of *Opalia abbotti* Clench & Turner, 1952, after Bouchet & Warén (1986: 551, fig. 1266). (15-16) *Punctiscala cerigottana* (Sturany, 1896). (15) Holotype of *Scalaria aspera* Watson, 1897 (= *P. cerigottana*), Funchal Bay, Madeira, 90 m, 5 mm., after Bouchet & Warén (1986: 559, fig. 1262). (16) Microsculpture of intritacalx(?), after Bouchet & Warén (1986: 476, fig. 1124).

REPORT OF THE WSM MEETING - 2008

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The 41st annual meeting of the Western Society of Malacologists (WSM) was held June 5-8, 2008, at the U.S. Geological Survey, Menlo Park, California. The meeting was organized and ably run by WSM President Charles Powell, II. There were approximately 40 attendees, some from as far as Alaska and La Paz, México. Many of the presenters and attendees were students which bodes well for the future of malacology. The meeting conference room was an ideal venue, although large for the size of the audience. There was a huge screen, great projection equipment and comfortable chairs. The halls of the building were lined with beautiful maps and the reception area had two seismographs and an interesting fossil display.

The morning of the 5th started with registration and a viewing of poster presentations. Each of the registrants received a spiral-bound book on the program and the abstracts of the papers. This was followed by a welcome and opening remarks by the WSM President (Figure 1). The papers for the first day followed no centralized scheme but included papers on bivalves, banana slugs and nudibranchs. I was intrigued by a paper presented by Carlos Cáceres Martínez on the establishment of a familial enterprise in El Cardonal, Baja California Sur, México. To alleviate poverty in this poor Mexican fishing village, a mollusk shell handcrafts program was established in 2006. This program was designed to train the women of this community so that they could provide their families a means of extra income. It was a three year program divided as a motivation module (2006), basic skills of working with shells and various hand tools (2007) and shell handcrafts design (2008). A group of twelve women, "Mujeres Artesanas del Cardonal", was established, and six of these women have developed sufficient skills to produce goods for sale in the local



Figure 1. President Charles (Chuck) Powell opening the 2008 annual meeting of the Western Society of Malacologists.

community. They are now working on developing unique designs to further their ability to provide extra income for their families. A second paper that interested me was James H. McLean's yearly progress report on the completion of the gastropod volumes for the Northeastern Pacific. He said that the first of two volumes would cover the southern range. All the plates are completed and the good news was that the volumes will be published by the Santa Barbara Museum of Natural History. Dr. McLean stated that the first volume would be out within a year, but I think this is highly optimistic. A third paper of interest to me was "The fishery of the mangrove black ark *Anadara tuberculosa* (Sowerby) (Bivalvia: Arcidae) in Baja California Sur, México" by Esteban F. Felix-Pico, et al. The type of terrain that they live in was of particular interest since

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we now have a population of *Anadara multicostata* in Mission Bay in San Diego where there are no mangroves. We have found a pair of dead *Anadara tuberculosa* in the past in Mission Bay.

The second day of the meeting was devoted to Cenozoic Molluscan Research: Paleontological papers presented in honor of Ellen James Moore. It was a session organized and chaired by George L. Kennedy. Many of the papers were historical in nature and many showed pictures of early U.S. paleontologists. The most fascinating to me was Matthew James' paper entitled, "Shells of Contention: The Ochsner-Oldroyd-Dall Controversy." This controversy concerned the publishing of data on 25,000-30,000 fossil marine mollusks and land snails collected by W.H. Ochsner during the 1905-1906 California Academy of Sciences Expedition to the Galapagos Islands. Ochsner, I.S. Oldroyd and W.H. Dall were all very strong-willed people and the prior agreements on publishing the data became contentious. Resolution of the problem did not occur until Ochsner and Dall had both died in 1927, and the delay in publication severely impeded the malacological success of the expedition. Another very interesting paper was "A Diverse Chiton Fauna from the Late Pliocene (~3 MA) part of the San Diego Formation" by Michael J. Vendrascio, et al. The paper consisted of a chiton assemblage of more than 15,000 valves collected by George P. Kanakoff from (1897-1973) from the upper Pliocene part of the San Diego Formation. This resulted in about fourteen extant and four new extinct species. These fossils expand the known stratigraphic and paleontological ranges of many of the West Coast genera and species.

The final day had a variety of interesting papers, with many on opisthobranchs and chitons. I was impressed by the paper "New Records of Holoplanktonic Mollusks (Mollusca: Gastropoda) in the Gulf of California" by Orso Angulo, et al. This paper was awarded the best student paper of the meeting. His work was based on 49,404 organisms collected on seven institutional surveys in the Gulf of California using oblique Bongo tows. This resulted in 66 species of which 38 are new records. The most recent publication on holoplanktonic species in the Gulf by Seapy and Skoglund (2001) in *The Festivus* had only listed 16 species, so this latest work is a huge increase in such species. Orso's presentation contained beautiful

photographs of the 66 species. Another very interesting presentation was by D.J. Eernisse and A. Draeger entitled, "Two Giant Species of *Stenosemus* von Middendorff, 1847 from Seamounts off Southern California." The specimens, larger than any currently recognized congeners, were collected by geologists at Monterey Bay Aquarium Research Institute during exploration of seamounts off southern California. It is difficult to explain how these new *Stenosemus* were able to get so large living on seamounts at bathyal depths.

A group picture was taken after the afternoon session and is shown here as Figure 2. This was followed by the WSM business meeting. The main emphasis of this meeting was to discuss methods of increasing attendance at future meetings and how to provide funding for student grants. Few of the people attending were familiar with how the organization had operated in the past but were interested in rejuvenating the WSM.

Next year's meeting will be in the Los Angeles-Santa Barbara area and will be run by President-elect Michael Vendrascio. The 2010 meeting will be run by George Kennedy and will most likely be in San Diego. George will be looking into the possibility of combining the meeting with AMS. The 2011 meeting will be hosted by Esteban Félix Pico and will be held jointly with the Mexican Malacological Society in La Paz, Baja California Sur, México.

Starting in late afternoon, the group had a beautiful barbecue on the backyard patio of the USGS featuring a roasted turkey, several salads, shrimp, tuna and other assorted goodies. This was instead of the traditional banquet. The BBQ was excellent but as an old-timer I sure missed having an opening reception and our traditional banquet. After all the food we went back to the conference room for our annual reprint sale. George Kennedy, as usual, ran this event and he had many interesting reprints available at very low prices.

The final event for the meeting, held on Sunday, June 8, was a field trip to observe mollusks and other fossils from the Purisima Formation.

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Figure 2. The group photo at the 2008 WSM meeting.

Front row (left to right): Charles Powell, Ashley Fore, Eric Gonzales, Laney Whitlow, Albert Rodrigues, Elizabeth Moore, Carlos Cáceres Martinez, Juliana Cáceres Barnios (baby), Daniela Barnos Ruiz.

Second row (left to right): Raed El Hajjaoui, Vicky H. Lee, Patty Jo Hoff, Clay Carlson, Neil Fahy, Marta Pola, Hans Bertsch, Rosa Campay, Jan Leonard.

Third row (left to right): Doug Eernisse, Michael Vendrasco, Esteban Felix Pico, Orso Angulo, Patrick I. LaFollette, Kelvin Barwick, Chris Kitting, Carole Hertz, Jules Hertz, Nora Foster, Terry Gosliner, George Kennedy.

The Festivus.
American Museum of Natural
History
Received on: 07-16-08

QL401
.F418
v. XL
no. 8
Aug 14,
2008



THE FESTIVUS

A publication of the San Diego Shell Club

ISSN 0738-9388

Volume: XL

August 14, 2008

Number: 8

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Address all correspondence to the San-Diego Shell Club, Inc.,
c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111, USA.

The Festivus is published monthly except December.
The publication date appears on the masthead above.
Single copies of this issue: \$5.00 plus postage.

Meeting date: third Thursday, 7:30 PM,
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PROGRAM

MARINE BIODIVERSITY RICHNESS AND RESOURCE USE IN NORTHWEST MÉXICO, WITH THE ROLES OF SCIENCE, ENVIRONMENTAL EDUCATION AND A CONSERVATION ETHIC

Hans Bertsch, Research Associate at California Academy of Sciences and his wife Rosa del Carmen Compay Villalobos will present a PowerPoint program

on the biodiversity of marine life in the Sea of Cortez, discussing problems arising from over-fishing and poor planning and the need for wise environmental measures.

Meeting date: August 21, 2008

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Map for September party enclosed	

CLUB NEWS

Minutes of the San Diego Shell Club Meeting 17 July 2008

The meeting was called to order by President Jules Hertz at 7:35 pm. Minutes of the previous meeting, as published in *The Festivus*, were approved and accepted by the members. Silvana Vollero's treasurer's report indicates all is well. Librarian Marilyn Goldammer reported that we purchased the new 2008 *Light and Smith Manual*, and it now can be checked out. [Proceeds from the Club's book and reprint sales and mini-book auctions go to purchase new books for the library.]

The September get-together will be a pot-luck held at the home of Larry and Debbie Catarius on September 13th; more news on this later.

Carole Hertz introduced Amabelle Aguelo, a 10th grader at Mt. Miguel High School and the Club's 2008 Science Fair winner. Amabelle provided an overview of her work on the effects of pesticides on the fertility of purple sea urchin eggs. For her work, the Club presented her with a biology book of her choice, the 4th edition of Barnes' *Invertebrate Zoology*.

Carole Hertz introduced our speaker for the evening, Club member Don Pisor. Don and dive friend and Club member, Duffy Daughenbaugh, made a dive trip to Pitcairn and Henderson Islands in January -February of this year. After multiple flights, and days at sea, they arrived at Pitcairn Island, the resting place of the famed HMS *Bounty*. Approximately 57 people live on the island, and that includes five children. The island is administrated by New Zealand. Life on the island focuses on tourism, as agriculture and even making a living from the sea is nearly impossible and existence is somewhat spartan. Water conditions off both islands were good to excellent, but the lack of fish and shells was unexpected. Some interesting shells were found including an attractive harp shell and a large Map cowry. It was a most enjoyable presentation.

The meeting was adjourned at approximately 8:55 pm for socializing and refreshments provided by Bruce Kemp and Paul Tuskes.

Paul Tuskes

The Club's Annual September Party Save the Date

Once again Debbie and Larry Catarius have gene-

rously offered their garden for the Club's annual September party. It will be held on Saturday afternoon September 13th beginning at 4 pm. A sign-up sheet for the potluck was passed around at the July meeting and will be available again for sign-up at the August meeting. This is always a most enjoyable party – plan to attend.

Dues Increase for Overseas Subscribers

The San Diego Shell Club is sorry to announce that the overseas subscription rate for *The Festivus* will increase in 2009. The rate was last changed in 1995 even though the postal rates have increased many times since then. Despite the fact that the Club subsidizes the publishing of *The Festivus*, we could not continue to absorb the large increases in postage in 2007 and 2008. As an example, the airmail postage rate to Europe in 2006 for a minimum-size issue was \$1.40; this increased to \$1.60 in 2007 and \$2.00 in 2008. The subscription rate for 2009 will be \$30 for Canada and Mexico and \$40 for all other countries. The domestic rate will remain unchanged for 2009.

Additions and Changes to the Roster

Museum National Histoire Naturelle Bibliotheque de Malacologie, CP 51, 57 Rue Cuvier, 75231 Paris Cedex 05, France (change of address).

Myers, Thomas, 3050 Rue D'Orleans, Unit #472, San Diego, CA 92110. Phone: 619-964-9963. E-mail: bajahobo@yahoo.com

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Woolsey, MaryJo (Jody), (e-mail change)
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Club Program Schedule for the Rest of 2008*

September – annual September Party [see col. 1]

October – on new work/discoveries on chitons by Douglas Eernisse

November – on what will you do with your collection by Henry Chaney

December – annual Christmas Dinner Party

* topics subject to change - except for the parties.

AN UNDESCRIBED PANAMIC *CYCLOSTREMISCUS* (TORNIDAE: VITRINELLINAE: GASTROPODA)

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In February 1996 during a visit to Kirstie Kaiser in Puerto Vallarta, Jalisco, México, we (Paul and Carol Skoglund, Kirstie Kaiser and Carole and Jules Hertz) traveled to Barra de Navidad, Jalisco. During our stay there we dredged a vitrinelled that we had never seen before (Figure 1). This empty, sturdy white shell with a deep umbilicus, flattened peripheral keel and strong raised spiral cords on the base and dorsum was unusual because of its large size (maximum diameter: 10 mm, height 2.2 mm). It was dredged in Bahía de Navidad in 23-55 m on mud bottom and was so different from any vitrinellids we had seen, that we believed it to be undescribed. We dredged that area again in 2005 and most recently in 2007 but did not find another specimen.

Our shell best fits the description of the genus *Cyclostremiscus* Pilsbry & Olsson, 1945: 266. Species in this genus are solid, depressed, discoidal, much wider than high, umbilicate and of few whorls. The genus *Cyclostremiscus* is now placed in the family Tornidae Sacco, 1896, within the subfamily Vitrinellinae [see Bouchet & Rocroi, 2005, pp. 172, 252].

In the Panamic Province a close congener, *C. gordana* Hertlein & Strong, 1951, has a 9.7 mm diameter shell with a peripheral keel, but differs in its spiral sculpture and axial lines on the base; *Cyclostremiscus major* Olsson & Smith, 1951, also has the large size (10.9 mm diameter) of our undescribed *Cyclostremiscus* but does not have a peripheral keel.

Bieler and Mikkelsen did an in-depth study of the anatomy and reproductive biology of the western

Atlantic species *Cyclostremiscus beauii* (Fischer, 1857). It too is a large species which attains a diameter of 11.5 mm but its height can be 6.2 mm, not flattened as in the Panamic species figured here.

We had asked for the opinions of two specialists, Rüdiger Bieler (Field Museum of Natural History) and James H. McLean (Natural History Museum of Los Angeles County, LACM), concerning our shell. Photos of our specimen by the late Paul Skoglund were sent to both. Bieler confirmed our generic placement and commented that it was an "interesting beast" (pers. comm., 23 Sept. 2004). McLean replied, "It certainly is new and I don't have it ... I encourage you to describe it" (pers. comm., 20 Sept. 2004).

We have examined the molluscan collections of the Santa Barbara Museum of Natural History and the San Diego Natural History Museum and McLean checked the collections of the LACM. None had this species. Since we have only one specimen, we have hesitated to publish it as a new species. It is our hope that these photos will bring to light more specimens so that the species can be recognized at long last.

Acknowledgments

Our appreciation to Rüdiger Bieler and James McLean for looking at the photos of our specimen in 2004 and again to Dr. Bieler for his information on the change of family [from Vitrinellidae to Tornidae] for our *Cyclostremiscus*.

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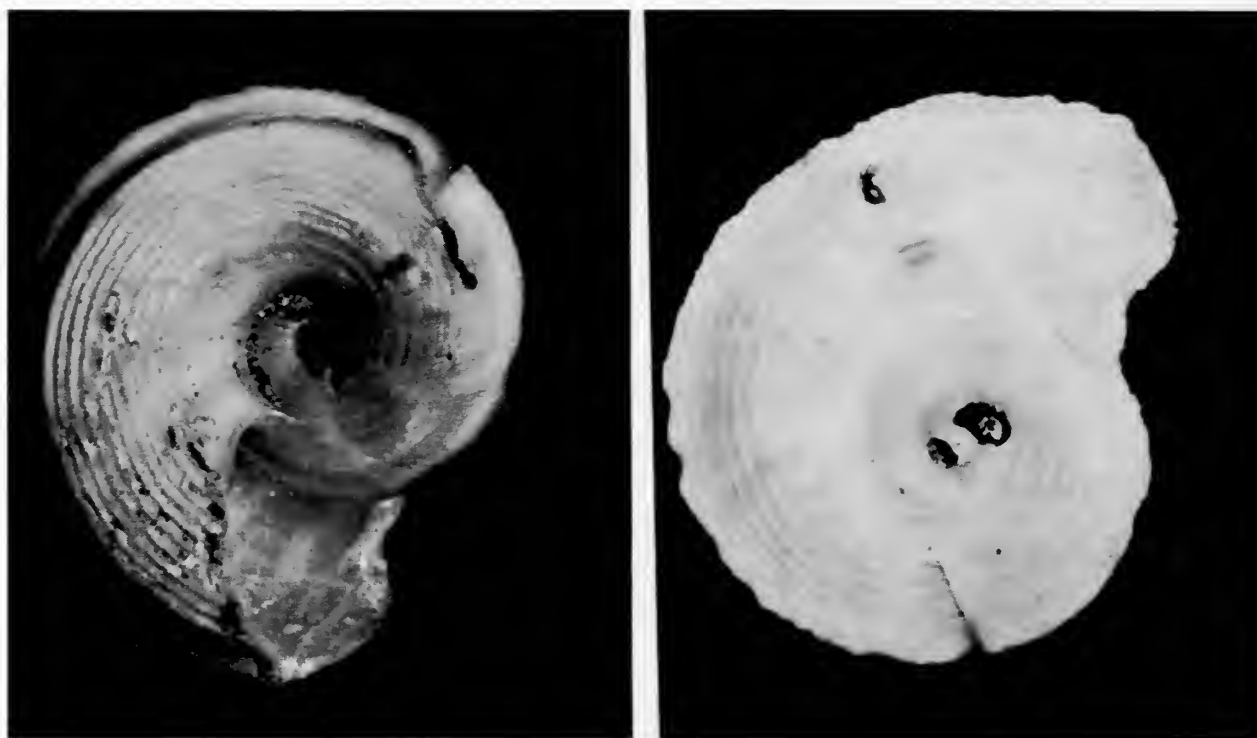


Figure 1. *Cyclostremiscus* sp. Dorsal and apertural views of the 10 x 2.2 mm shell. Bahía Navidad, Jalisco, México, dredged in 23-55 m, mud bottom. Leg. Paul & Carol Skoglund and Kirstie L. Kaiser, 8-10 February 1996. C. Skoglund Collection. Photos: Paul Skoglund.

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SELLING ON EBAY

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As a shell collector I often purchase groupings of shells with the hope of acquiring the one or more gems present in the lot. The question then becomes what to do with the remainder. Since many of the shells were purchased through Ebay it seemed only logical to try selling them on Ebay. Since I had never sold a shell on Ebay I did not know what to expect. I found that the thrill of watching the bid price rise in the final moments of the auction was slightly more exciting than the anticipation of possibly obtaining that particularly desirable shell. However, as with buying there are a number of things you should know before you begin selling.

First, selling on Ebay is not free. Know your costs before you list. There are a number of options offered to the seller to enhance the sale of an item and each has its price. As a beginner I sold items with the least expensive option available which was listing the item using the standard Ebay format with one photo. This approach generally comes with two fees the insertion fee which is based on the listing price and a final value fee which is based on the selling price. Generally speaking you tend to make a greater profit for items of higher value (Table 1).

Second, remember that if there is only a single bidder that your item will sell for the listing price so make sure your listing price is the amount you are willing to accept for your item before listing (Table 2).

Third, your listing should be attractive to potential buyers. When determining what information to provide I usually look at other popular sellers' listings. These will be sellers whose items, at any given time, have the most bids. Develop your listing based on these sellers' formats to help appeal to those buyers.

Fourth, shipping can be expensive so you want to be sure to inform buyers what those costs might be or they may presume you are paying these costs. Shipping should include not only postage but also the cost of the envelope or box and for proper packaging such as bubble wrap or Styrofoam peanuts. Consequently,

when selling items of a consistent size or weight I usually charge a flat rate for shipping within the United States. If you are unsure of the shipping cost, let buyers know that they will be charged the actual shipping cost.

Fifth, it will be important if you are selling a number of identical items that you keep track and assure that the correct item goes to the proper buyer. I recommend giving each item a number and inputting that number in your Ebay listing so that you can easily match the item to the buyer at the end of the auction. This will avoid having to refund the purchase price to an unsatisfied buyer and re-listing the item.

Sixth, notify buyers that there will be a set period of time for which they may pay for the item. I generally give 7 days from the end of the auction to receive payment. If payment is not received in that time I will have the option of voiding the sale and placing the items up for sale in the next auction.

To start selling click on "Sell" in the upper right corner of the Ebay Web page. The window will ask you to enter a word for the item you wish to sell to help identify the category in which the item will be listed. For example, I usually give the genus name if I am selling a shell such as "*Cypraea*." Once you have done this click on the "Start Selling" button. A number of categories, based on your key word or words, will be listed to assist you in selecting the correct category. Check the box of the category desired and click on "Save:Continue." The next window will have boxes to be filled in for describing your item including the required boxes named "title," "description" and "listing price." You must have these boxes filled to proceed in the listing process. I also recommend a photo. Ebay does not charge for the first photo, however additional images cost \$0.15 per photo. A gallery photo is displayed with the listing title and does not require that the listing be opened to view the image. This photo costs \$0.35.

In an auction items are listed for set periods of time that you may select or if no time is selected the auction will end in seven days. Ebay permits buyers and sellers to interact during an auction. This can be very helpful if a

potential buyer has a question regarding the shell such as its condition, reduction of shipping costs for multiple purchases and/or the location of the shell. You should be prepared to provide additional photos of the shell if necessary and be willing to combine items for a single shipping cost if possible.

Once the auction has ended you must provide a billing statement containing the final purchase price of the shell(s) including shipping costs. Ebay will provide you with a standard format billing statement in which you can include the shipping cost, which will automatically be sent to the buyer upon your authorization. If you are uncertain of the shipping cost you can package the shells and have the Post Office provide you with the actual cost for shipping to the desired destination. I do not recommend using the United States Postal Service postage calculation program available on line. This program has been consistently inaccurate on a number of packages I have shipped in the past.

You may accept a variety of payment methods such as personal check, money order, or a payment service like PayPal. While I do not recommend accepting personal checks most sellers do accept PayPal. In order to use PayPal you must have an account. To establish an account go to www.paypal.com and click on the button at the top center of the screen which says "Sign Up Now!" A window will present you with three account options; a "Personal Account," a "Premier Account" and a Business Account. I recommend a personal account for now. Click on the button in the center of the "Personal Account" window that says "Start Now" and fill in the information requested. They will require a credit card number as collateral to assure that payments can be made upon request. I recommend selecting a credit card with a low limit to protect you in the event of identity theft.

I highly recommend selling shells on Ebay provided you remember the six items I have discussed above. Following are some notable shells that have recently been sold on Ebay (Plate 1).

Table 1. Fees for selling on Ebay

Insertion Fee (You will always be required to pay this fee)		Final Value Fee (You are only required to pay this fee if the item listed sells)	
List Price	Cost	Selling Price	Cost
\$0.01-0.99	\$0.20	\$0.01-25.00	5.25%
\$1.00-9.99	\$0.40		
\$10.00-24.99	\$0.60		
\$25.00-49.99	\$1.20	\$25.01-1000.00	5.25% for first \$25.00 + 3.25% remainder
\$50.00-199.99	\$2.40		
\$200.00-499.99	\$3.60		
\$500.00 and up	\$4.80	\$1000.00 or more	5.25% for first \$25.00+ 3.25% for up to \$1000.00 + 1.50% remainder

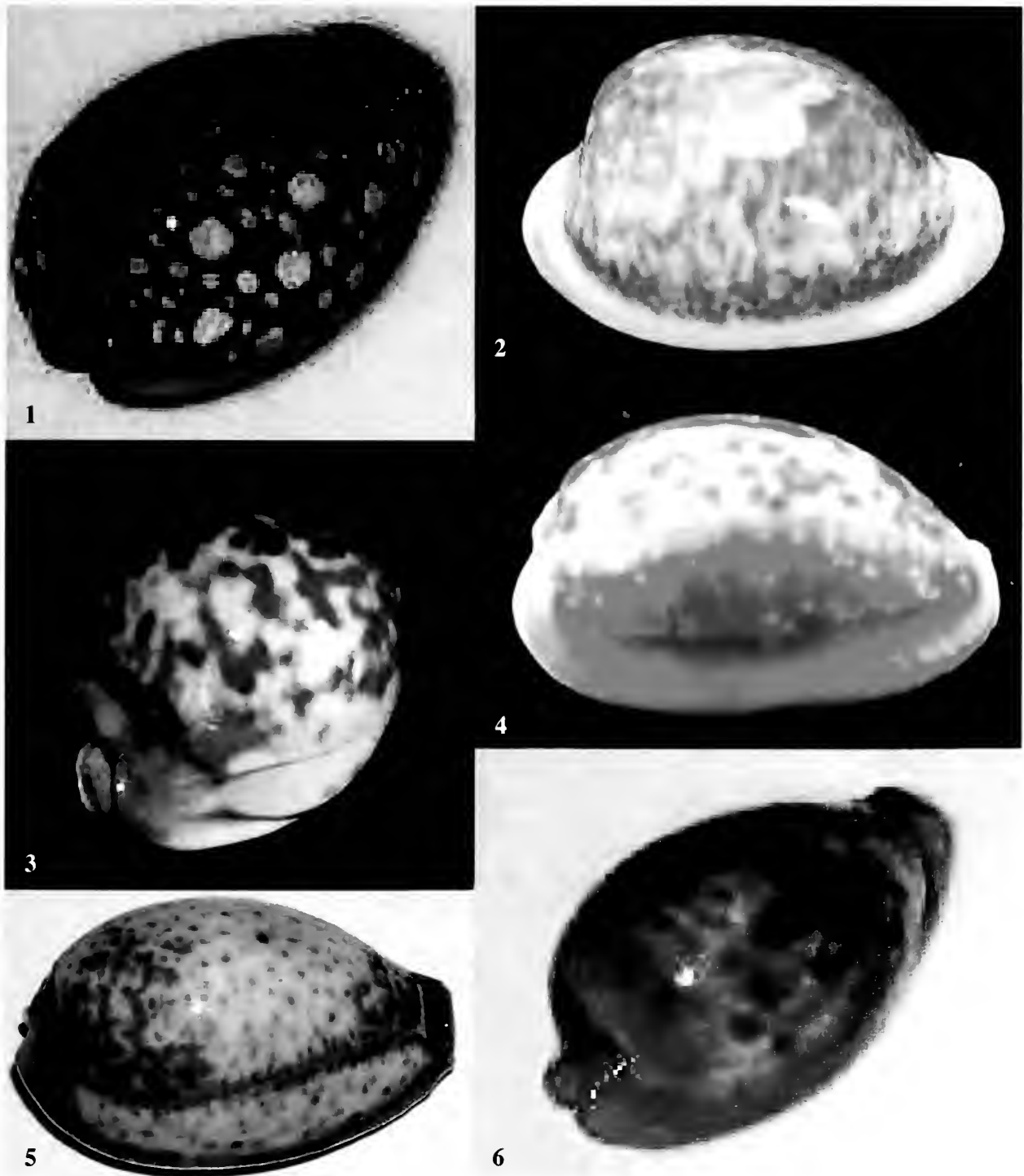


Table 2. Listing selling prices on Ebay

Shell Description	Listing Price	Final Auction Price
<i>Cypraea citrina</i> dark, extra gem!!!- Madagascar - 19.65 mm Item number: 200148496207	US \$7.00 Sept. 07-07 12:15:00 PDT	US \$116.50 Sept. 14-07 12:15:00 PDT
<i>Cypraea fuscrobura</i> Item number: 290176458353	US \$12.97 Oct. 31-07 03:48:20 PDT	US \$37.93 Nov. 06-07 10:36:13 PST
<i>Cypraea helvola</i> Item number: 290177209586	US \$0.99 Nov. 02-07 02:42:59 PDT	US \$9.98 Nov. 06-07 10:37:14 PST
<i>Cypraea jeania aurata</i> 75.86 mm Australia Item number: 200167802538	US \$1.00 Nov. 01-07 13:45:00 PDT	US \$551.01 Nov. 08-07 12:44:49 PST
<i>Cypraea spurca tunisia</i> , white!!! Item number: 320177456920	US \$4.00 Nov. 01-07 11:40:22 PDT	US \$33.00 Nov. 08-07 02:39:48 PST
<i>Cypraea surinamensis</i> , 26.35 mm dark, special – Brasil Item number: 200166056873	US \$1.00 Oct. 25-07 13:15:00 PDT	US \$410.00 Oct. 27-007 18:54:36 PDT



THE FESTIVUS

A publication of the San Diego Shell Club

ISSN 0738-9388

Volume: XL

September 11, 2008

Number: 9

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Membership (includes family). Domestic \$20.00;
Overseas (air mail):\$30.00; Mexico/Canada (air mail):\$20.00.

Address all correspondence to the San Diego Shell Club, Inc., c/o
3883 Mt. Blackburn Ave., San Diego, CA 92111, USA.

The Festivus is published monthly except December.
The publication date appears on the masthead above.
Single copies of this issue: \$5.00 plus postage.

Meeting date: third Thursday, 7:30 PM,
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PROGRAM

The September Party
Saturday, September 13, 2008
4 pm – ?

There will be no regular meeting this month.

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Late Pleistocene and Holocene mollusks and foraminifers from near Cordell Bank, offshore central California; their age and environmental significance	
CHARLES L. POWELL, II, & MARY MCGANN	101

CLUB NEWS

Minutes of the San Diego Shell Club Meeting 21 August 2008

The meeting was called to order by President Jules Hertz at 7:45 pm. Minutes of the previous meeting, as published in *The Festivus*, were approved and accepted by the members. Silvana Vollero's treasurer's report indicates all is well.

Carole Hertz reported that she and librarian Marilyn Goldammer spent considerable time updating and culling material from the Club's library as well as giving it an overdue and necessary cleaning. She stated that some duplicate material, books and pamphlets were removed to be sold later at either Club book sales or mini-auctions to make space for books from the Mulliner library and future purchases of more up-to-date material. At the end of this process, Marilyn will prepare a new, current library list which will be available on the Club's website. There will be hard copies available in the library.

Jules passed a sign-up sheet for the upcoming September party to be held at the Catarius' home on Saturday September 13th. The cookie list was also circulated for cookie volunteers for the remainder of the year.

Carole then introduced the speaker for the evening, Hans Bertsch, who with his wife Rosa prepared this presentation. After a pause while member Bob Petroski worked with Hans to get the PowerPoint setup to start – many thanks to Bob and his considerable help – Hans gave his very interesting and important program on conserving the biodiversity of the Sea of Cortez touching on the themes of biodiversity richness, bad use and overfishing, sustainable use, doing science, environmental education and the conservation ethic. He stressed that what happens in the Sea of Cortez can be applied to environments worldwide.

He contrasted the fine improvements in environmental sustainability provided by the ejidos (Mexican cooperatives) in central Baja California, for example, with the ill-advised Escalera Nautica, constructed to increase tourism but which is destroying the very natural habitats which attracts tourism and discussed areas in which commercial projects coexist successfully with nature.

He closed his program by willing us all to teach and follow "an effective conservation ethic for humans

and the living waters of all seas and lands as we search for understanding, appreciation and conservation of life's beauty."

Following Hans' program, an enjoyable PowerPoint show done by Wes Farmer of the 2008 auction was shown.

Members then adjourned for refreshments and social time.

The Club's Annual September Party September 13, 2008

Once again Debbie and Larry Catarius have very generously offered their garden for the Club's annual September party. It will be held on Saturday afternoon September 13th beginning at 4 pm. If you didn't receive a map to the party with your August issue and need one please call Carole & Jules Hertz 858-277-6259 and a map will be sent to you. Also, call this number if you haven't signed up for the gathering and let them know what you will bring. The Club will provide coffee, soft drinks, water, wine and beer and attendees are asked to bring either a salad, main dish or dessert to serve 12.

This is always a most enjoyable party – plan to attend.

Dues Increase for Overseas Subscribers

The San Diego Shell Club is sorry to announce that the overseas subscription rate for *The Festivus* will increase in 2009. The rate was last changed in 1995 even though the postal rates have increased many times since then. Despite the fact that the Club subsidizes the publishing of *The Festivus*, we could not continue to absorb the large increases in postage in 2007 and 2008. As an example, the airmail postage rate to Europe in 2006 for a minimum-size issue was \$1.40; this increased to \$1.60 in 2007 and to \$2.00 in 2008. The subscription rate for 2009 will be \$30 for Canada and Mexico and \$40 for all other countries. The domestic rate will remain unchanged for 2009.

Additions and Changes to the Roster

Change of e-mail

Bob & Van Dees – robertvdees@gmail.com

LATE PLEISTOCENE AND HOLOCENE MOLLUSKS AND FORAMINIFERS FROM NEAR CORDELL BANK, OFFSHORE CENTRAL CALIFORNIA; THEIR AGE AND ENVIRONMENTAL SIGNIFICANCE

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Abstract

Thirty-one molluscan and 73 foraminiferal taxa were recovered from three dredge samples collected at outer shelf to upper slope depths (89 to 215 m) near Cordell Bank, central California (38°N, 123°W). Sample CoBa-2-90 contained the most diverse fauna: 10 molluscan and 73 foraminiferal taxa. This sample was collected between 155 and 255 m depth, west of Cordell Bank, and ^{14}C dating of *Chlamys rubida* (Hinds) valves from the sample has resulted in an age of 15.26 ± 0.045 ka. The ^{14}C age determination, along with the presence of mollusks with modern ranges mostly north of the fossil locality and cool water foraminifers, indicate that this faunal assemblage was deposited around the last glacial maximum (oxygen isotope stage 2). Samples CoBa-3-90 Dredge 2 and CoBa-3-90 Dredge 3 were dredged from shallower depths (89 to 100 m), east of Cordell Bank. These samples contained 25 molluscan taxa and no foraminifers. ^{14}C dates on *Glycymeris septentrionalis* (Middendorff) and *Humularia kennerleyi* (Reeve) valves constrain the age of these samples to between ~ 10.8 and ~ 10.9 ka (early Oxygen Isotope Stage 1). The bivalve *Mya truncata* Linnaeus from these samples indicates that water temperatures were still cooler than present-day at Cordell Bank between ~ 10.8 and ~ 10.9 ka. In addition, the macrofauna from these samples indicates shallow water depths (1-10 m). This is much shallower than the 89 to 100 m depth from which the samples were collected.

Introduction

In the summer of 1990, field work was undertaken off the coast of San Francisco by the U.S. Geological Survey to: 1) obtain side scan sonar images and video transects to aid in locating some of the more than 47,000 containers of low-level radioactive waste that were dumped between 1946 and 1970 on the continental shelf and slope south of the Farallon Islands west of San Francisco (Figure 1).

<http://walrus.wr.usgs.gov/farallon/radwaste.html>;

<http://pubs.usgs.gov/fs/farallones/index.html>); 2) provide

high resolution images of the physiography of the central California coast and continental shelf

(<http://walrus.wr.usgs.gov/gloria/gloria.html>); 3) obtain

cores to document Quaternary paleoceanographic changes; and 4) collect granitic rocks from the seafloor in the vicinity of the Farallon Islands and Cordell Bank in order to characterize their strontium values and compare the chemical data from these Cretaceous Salinian block rock samples to rocks of similar age at Point Reyes, Tomales Bay, and Montara, Marin County, California.

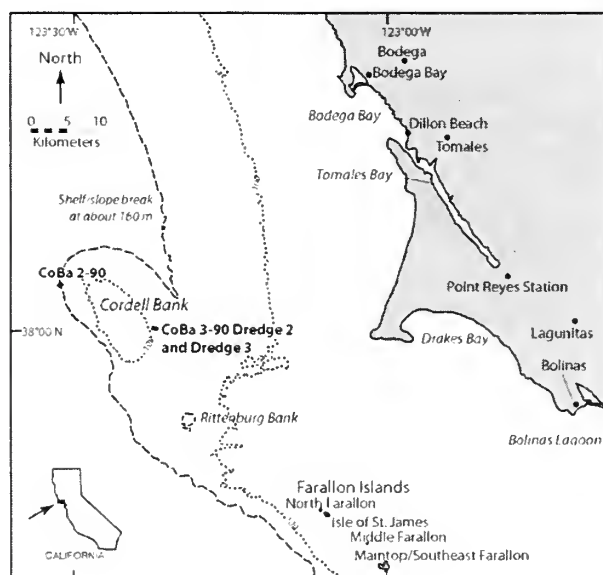


Figure 1. Index map showing the general location of Cordell Bank in relation to other geographic features of the central California coast. The dashed line is the approximate shelf/slope break at a depth of about 160 m near the Farallon Islands and Cordell Bank. The dotted contour indicates 100 m and outlines the position of Cordell Bank.

Dredge samples containing macro- and microfaunal specimens were concurrently collected with the granite samples by the U.S. Geological Survey R/V *Farnella* in the vicinity of Cordell Bank on August 16, 1990 (Figure 1). A cursory examination of the biota suggests that they are late Pleistocene age, that some were extra-limital (i.e., not found at the present-day latitude of Cordell Bank), and that several were not typical of the water depths from which the samples were collected. A similar fauna collected at comparable depths in Monterey Bay and ^{14}C dated at ~ 17 ka (Powell, 1994) led to speculation that the Cordell Bank samples were also from a late Pleistocene sea-level low stand and that the specimens warranted further investigation. All mollusks are deposited at the University of California, Museum of Paleontology (UCMP). The foraminiferal slides and processed residues are on file at the U.S. Geological Survey in Menlo Park, California.

Two other undocumented geographically and bathymetrically anomalous molluscan and foraminiferal faunas are known from the northeast Pacific Ocean: one offshore southern Oregon (Powell, unpublished data) and another from Islas Revillagigedo west of mainland Mexico (Powell, unpublished data; McGann, unpublished data). Both faunas are currently being studied.

Sample CoBa-2-90

Methods

Sample CoBa-2-90 is composed of material dredged on a single run, from 155 to 215 m depth, west of Cordell Bank. Most of the sediment and smaller, macro- and microfossils accompanying the larger *Chlamys* specimens were washed overboard when the pectens were cleaned with a shipboard hose. However, some sediment was retained and the smaller mollusks and foraminifers were recovered from the sediment adhering to the interior of a few *Chlamys* valves. ^{14}C age determinations on several of these *Chlamys rubida* valves were provided by the U.S. Geological Survey Radiocarbon Laboratory in Menlo Park, California. Conventional ^{14}C dating of this sample resulted in an age determination of 15.260 ± 0.045 ka (USGS 30-33; Powell, McGann & Trimble, 1992) correlating to the Oxygen Isotope Stage 2 sea-level lowstand.

Mollusca

Only ten molluscan taxa were present in this sample (Table 1); three were identified to the species level. Most of the taxa are found today north of Cordell Bank.

The bivalve *Nuculana minuta* (Fabricius), reported as extra-limital in preliminary results of this study (Powell, McGann & Trimble, 1992) is re-identified here as *N. pernula* (Müller, 1779). Hence, no extra-limital taxa were found. Because of the limited number of specifically identified mollusks in this sample, the geographic and depth ranges of these species, based on modern occurrences, is not precise (i.e., 35°N - 58°N ; 20 to 200 m; Figures 3, 4). However, since most taxa range north of the fossil locality, cooler water temperatures than off Cordell Bank today are suggested.

Foraminifera

The sediment washed from several *Chlamys* valves was wet-sieved through nested 63 μm , 150 μm and 1.0 mm screens to remove the clayey fraction. The remaining (>63 μm) sized fractions were then transferred onto filter paper and air-dried. A microsplitter was used to split the sample into an aliquot containing at least 300 benthic and 300 planktic foraminifers and all of the specimens were picked from this aliquot and identified. The relative abundances for benthic and planktic foraminiferal species were determined separately.

A diverse benthic foraminiferal assemblage of 63 species was recovered (Table 2). More than half of the fauna is comprised of species that today reside in the vicinity of the shelf break (Lankford & Phleger, 1973; Ingle, 1980; McGann, 2002) at depths similar to those where the sample was collected. The shelf break taxa include *Cassidulina limbata* Cushman & Hughes (18.2%), *C. tortuosa* Cushman & Hughes (16.4%), *C. californica* Cushman & Hughes (15.6%), and *Trifarina angulosa* (Williamson) (5.7%).

Nineteen percent of the fauna is characteristic of the inner shelf (0-50 m; Lankford & Phleger, 1973; Ingle, 1980; McCormick et al., 1994; McGann, 2002, 2007). These shallow-water species include *Buccella frigida* (Cushman), *Buliminella elegantissima* (d'Orbigny), *Cibicides fletcheri* Galloway & Wissler, *Dyocibicides biserialis* Cushman & Valentine, *Elphidium excavatum* var. *clavatum* Cushman, *Elphidium excavatum* var. *selseyensis* (Heron-Allen & Earland), *Glauvulina californiana* Lankford, *Nonionella basispinata* (Cushman & Moyer), *Quinqueloculina akneriana* d'Orbigny, *Rosalina globularis* d'Orbigny, *Rotorbinella turbinata* (Cushman & Valentine) and *Trichohyalus ornatissima* (Cushman). The other 25% of the fauna is made up of the remaining 47 species.

Ten species of planktic foraminifera were also

covered (Table 2). The assemblage is dominated by *Globigerina bulloides* d'Orbigny (45.5%), a dissolution-resistant species (Berger, 1968; Thunell & Honjo, 1981), which prefers, but is not restricted to, cool waters that are associated with upwelling (Thunell & Reynolds, 1984; Reynolds & Thunell, 1985; Sautter & Thunell, 1989, 1991). The other dominant planktic foraminiferal species belongs to the *Neogloboquadrina* plexus as described by Kucera & Kennett (2000). Nearly 36% of the sample assemblage are the left-coiling *Neogloboquadrina pachyderma* B morphotype of the plexus (Kennett et al., 2000; Kucera & Kennett, 2000) which today dominates the colder waters ($< 8^{\circ}\text{C}$) of the subpolar and polar regions (Bandy, 1972; Kennett, 1976; Keller, 1978; Sautter & Thunell, 1989) and are also resistant to dissolution (Parker & Berger, 1971; Malmgren, 1983; Reynolds & Thunell, 1986). The right-coiling morphotype, *Neogloboquadrina pachyderma pachyderma* (Ehrenberg), which commonly inhabits modern temperate waters and is less resistant to dissolution, occurs only rarely in the sample assemblage (2.3%). *Globigerinita glutinata* (Egger) (6.3%) and *Globigerina quinqueloba* Natland (5.6%) also were recovered. Both of these taxa are common in colder water masses in the eastern Pacific Ocean (Reynolds & Thunell, 1985; Sautter & Thunell, 1989, 1991).

The planktic foraminifers provide biostratigraphic information for CoBa-2-90 as well. Unless the two specimens recovered of *Globigerina umbilicata* Orr & Zaitzeff are contaminants, their presence is indicative of a Pliocene to Pleistocene (not Holocene) age for the sample (Orr & Zaitzeff, 1971; Rögl & Bolli, 1973; Saito et al., 1981; coiling direction zones CD15-CD11 of Lagoe & Thompson, 1988). The right-coiling form *Neogloboquadrina pachyderma pachyderma* first appears in the early Pliocene [California margin zone 7 (CM7) of Kennett et al., 2000; Kucera & Kennett, 2000] and ranges to the present day, whereas *Neogloboquadrina pachyderma* B is first seen in the early to middle Pleistocene (CM2 zone of Kennett et al., 2000) and is still seen in the modern oceans (Kucera & Kennett, 2000). The overlap of these stratigraphic ranges suggests a Pleistocene age for the sample, in agreement with the late Pleistocene ^{14}C age of ~ 15.3 ka years determined from the *Chlamys* valves.

The foraminiferal planktic to benthic (P/B) ratio can be used as a bathymetric indicator since it generally increases with increasing water depth (Grimsdale & van Morkhoven, 1955). However, it is not a precise measure, due to the fact that the abundance of planktic

foraminifers can be influenced by depth, salinity, light and fluctuations in nutrients, as well as transport by currents (Murray, 1976; Gebhardt et al., 2003). In CoBa-2-90, nearly equal numbers of planktic and benthic specimens were recovered, suggesting the sample was deposited in open ocean conditions on the outer shelf to shelf break (Murray, 1976). More than half of the benthic foraminiferal assemblage of this sample is characteristic of these depths as well.

The CoBa-2-90 molluscan and foraminiferal assemblages suggest deposition in cooler water temperatures than present conditions where the sample was collected because: 1) most molluscan taxa range north of the fossil locality; and 2) cool water thriving planktic foraminifera dominate the microfaunal assemblage in abundances more typical of a planktic foraminiferal assemblage living in the Pacific Ocean off Washington today (Keller, 1978; Sautter & Thunell, 1989). In addition, foraminiferal assemblage dominance by benthic species that live near the shelf break, as well as the recovery of nearly equal number of benthic and planktic specimens, suggest deposition on the outer shelf to shelf break in open marine conditions. The abundance of inner shelf benthic foraminifers in CoBa-2-90 may be attributed to downslope transport or deposition during a period of lowered sea level. The faunal and chronological data of CoBa-2-90 suggest deposition during a late Pleistocene sea level lowstand, and that this sample correlates to age-constrained, fossiliferous deposits in Monterey Bay and at other locations along the coast of California (Powell, 1994). In Monterey Bay and the Cordell Bank area, significantly cooler water temperatures are postulated for the middle and late Pleistocene compared to present temperatures for this area.

Samples CoBa-3-90 Dredge 2 and CoBa-3-90 Dredge 3 Method

Samples CoBa-3-90 Dredge 2 and CoBa-3-90 Dredge 3 are composed of material from two dredge hauls traversing the same area between Cordell Bank and mainland California: one traveling eastward (CoBa-3-90 Dredge 2) and the other back to the west (CoBa-3-90 Dredge 3). Only larger molluscan specimens were recovered. No sediment was associated with these mollusk specimens; therefore, no smaller mollusks or foraminifers were recovered.

Twenty-five specimens of the bivalves *Glycymeris septentrionalis* (Middendorff) from CoBa-3-90 Dredge 2 and eight broken valves of *Humularia kennerleyi* (Reeve) from CoBa-3-90 Dredge 3 were ^{14}C dated.

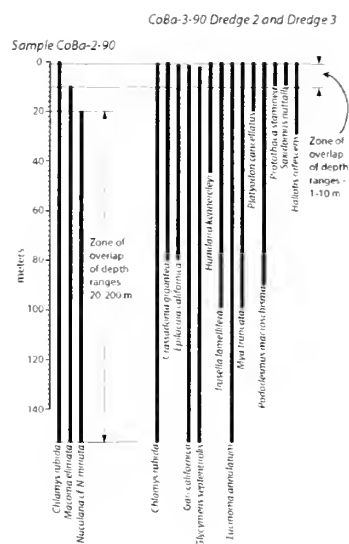


Figure 4. Depth distribution of selected mollusks recovered from samples CoBa-2-90, CoBa-3-90 Dredge 2, and CoBa-3-90 Dredge 3. Data from Coan, Scott & Bernard (2000) and McLean (2007). CoBa-2-90 mollusks have an overlapping depth range of between 20 and 200 m. Samples CoBa-2-90 and CoBa-3-90 dredges 2 and 3 taxa have an overlapping depth range of between 1 and 10 m.

The inferred paleobathymetry for the mollusks from these samples, based on modern depth data from Coan et al. (2000) and McLean (2007), is between 1 and 10 m (Figure 4). By subtracting the minimum and maximum inferred paleobathymetry from the minimum and maximum depths from which the samples were collected (89 and 100 m), sea level is determined to be between 79 and 99 m below present level about 10.8 ka. This is in general agreement with a sea-level determination of a minimum of 95 m below present at 10.5 ka in the vicinity of Vancouver and Queen Charlotte Islands in southern British Columbia (Luternauer et al., 1989), although local tectonics may influence this number.

Summary

The use of macro- and microfaunal analysis, and ^{14}C dating of mollusk shells, has made it possible to interpret the age, water depth, and environmental conditions under which three dredge samples collected

in the vicinity of Cordell Bank were originally deposited. The samples represent deposition during two different periods in the late Pleistocene and Holocene, around the last glacial maximum (approximately 20-15 ka years ago; Oxygen Isotope Stage 2) and when sea level was rising (about 10.8 ka years ago; early Oxygen Isotope Stage 1) towards its modern level. The biota of all three samples indicate water temperatures cooler than present today at the latitude of Cordell Bank. The results of this study emphasize the usefulness of integrating these methods to obtain information on paleobenthic and pelagic communities even with a limited sample size.

Acknowledgments

We wish to thank John Cannan (ship captain), Matthew Gilbey (chief engineer) and Albert Fuller (chief mate) of the R/V *Farnella* for their superb field effort, Herman Karl (USGS) for filling the role of chief scientist on the cruise, Duane E. Champion (USGS) for providing us the samples for this study, and Deborah Trimble (formerly USGS) for undertaking the ^{14}C analysis. Carol Reiss (USGS) is thanked for precisely plotting the location of the dredge hauls. We also want to thank Lindsey Groves (LACM), and Elmira Wan (USGS) for their helpful reviews of this manuscript.

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TABLE 1: Quantitative distribution of mollusks in Samples CoBa-2-90, CoBa-3-90 Dredge 2, and CoBa-3-90 Dredge 3 from around Cordell Bank, central California. Numbers in parentheses represent broken or partial specimens.

TAXA	LOCALITIES			COMMENTS
Mollusca	CoBa- 2-90	CoBa-3-90 dredge 2	CoBa-3-90 dredge 3	
Polyplacophora				
<i>Cryptochiton stelleri</i> (Middendorff, 1847)		(1)		
Bivalvia				
<i>Chlamys rubida</i> (Hinds, 1845)	78(29)	3(4)	2(2)	
<i>Clinocardium</i> sp.	(2)		(1)	
<i>Crassadoma gigantea</i> (Gray, 1825)			(2)	
<i>Epilucina californica</i> (Conrad, 1837)		1	4	
<i>Gari californica</i> (Conrad, 1849)		1(1)		
<i>Glycymeris septentrionalis</i> (Middendorff, 1849)		161	136 (16)	
<i>Humilaria kennerleyi</i> (Reeve, 1863)		5(10)	19(67)	
<i>Irus lamellifer</i> (Conrad, 1837)			1(1)	
<i>Lucinoma annulata</i> (Reeve, 1850)			1	
<i>Macoma elimata</i> Dunnill & Coan (1968)	1(3)			
<i>Macoma</i> sp.		1	1(2)	
<i>Modiolus</i> sp.		1	(2)	
<i>Mya truncata</i> Linnaeus, 1758		2	1(2)	It is an extra-limital northern taxon which today occurs only as far south as Neah Bay, WA (47° N). (pers. comm. P. Scott, 1991).
<i>Mytilus</i> sp.		(1)	(7)	
<i>Nuculana pernula</i> (Müller, 1779)	4			
<i>Nutricula</i> sp.	1			
<i>Platyodon cancellatus</i> (Conrad, 1837)		1		
<i>Pododesmus macrochisma</i> (Deshayes, 1839)		2(2)	2	
<i>Protothaca staninea</i> (Conrad, 1837)		9(3)	1(4)	The form found in these deposits is <i>P. s. ruderata</i> (Deshayes) an ecological morphotype usually associated with empty pholad burrows.
<i>Saxidomus nuttalli</i> (Conrad, 1837)		2(2)	cf.	
<i>Simomactra falcata</i> (Gould, 1850)		6(17)	1(12)	
Gastropoda				
<i>Bittium</i> sp.	14			
<i>Ceratostoma</i> sp.			(1)	
<i>Crepidula</i> sp.	(1)			
<i>Diodora aspera</i> (Rathke, 1833)		(1)		
<i>Epitonium</i> sp.	1			

<i>Haliotis rufescens</i> Swainson, 1822		(1)		
<i>Kurtziella</i> ? sp.	2			
<i>Lottia scabra</i> (Gould, 1846)			1	
Naticid indet		(2)	(2)	
<i>Oenopota</i> sp.	1			
<i>Puncturella</i> sp.	1			
<i>Serpulorbis</i> cf. <i>S. squamigerus</i> (Carpenter, 1856)		2		

TABLE 2: Quantitative distribution (raw count and percent abundance) of benthic and planktic foraminifers >0.63 mm in sample CoBa-2-90. Percentage of benthic and planktic foraminifers determined separately. X = rare specimens recovered in a qualitative (non-statistical) scan of the matrix not used in the quantitative study.

Species	Raw Count	Percentage Count
BENTHIC		
<i>Astrononion gallowayi</i> Loeblich & Tappan (1953)	3	0.6
<i>Bolivina pacifica</i> Cushman & McCulloch (1942)	4	0.8
<i>Bolivina spissa</i> Cushman (1926)	X	X
<i>Bolivina</i> sp.	1	0.2
<i>Buccella frigida</i> (Cushman, 1922)	31	6.3
<i>Buliminella elegantissima</i> (d'Orbigny, 1839)	3	1.6
<i>Cancris auricula</i> (Fichtel & Moll, 1798)	X	X
<i>Cancris inaequalis</i> (d'Orbigny, 1839)	X	X
<i>Cassidulina californica</i> Cushman & Hughes (1925)	77	15.6
<i>Cassidulina limbata</i> Cushman & Hughes (1925)	90	18.2
<i>Cassidulina tortuosa</i> Cushman & Hughes (1925)	81	16.4
<i>Cassidulina</i> sp.	5	1.0
<i>Cibicides fletcheri</i> Galloway & Wissler (1927)	15	3.0
<i>Cibicides lobatulus</i> (Walker & Jacob, 1798)	59	11.9
<i>Cibicides</i> spp.	2	0.5
<i>Cornuspira foliacea</i> (Philippi, 1844)	X	X
<i>Dentalina itai</i> Loeblich & Tappan (1953)	X	X
<i>Dentalina</i> sp.	X	X
<i>Dyocibicides biserialis</i> Cushman & Valentine (1930)	1	0.2
<i>Elphidium excavatum</i> var. <i>clavatum</i> Cushman (1930)	3	0.6
<i>Elphidium excavatum</i> var. <i>selseyensis</i> (Heron-Allen & Earland, 1909)	19	3.8
<i>Epistominella pacifica</i> (Cushman, 1927)	10	2.0
<i>Fissurina lineata</i> Williamson (1848)	X	X
<i>Fissurina lucida</i> Williamson (1848)	4	0.8
<i>Fissurina marginata</i> (Montagu, 1803)	2	0.4
<i>Fissurina orbignyana</i> (Sequenza, 1862)	X	X
<i>Fissurina serrata</i> (Schlumberger, 1894)	X	X
<i>Florilus labradoricus</i> (Dawson, 1860)	X	X
<i>Fursenkoina</i> sp.	1	0.2
<i>Gaudryina arenaria</i> Galloway & Wissler (1927)	X	X

Species (cont'd)	Raw Count	Percentage Count
<i>Glabratella californiana</i> Lankford (1973)	1	0.2
<i>Globobulimina auriculata</i> Bailey (1851)	3	0.6
<i>Globocassidulina subglobosa</i> (Brady, 1881)	X	X
<i>Lagena laevis</i> (Montagu, 1803)	X	X
<i>Lagena meridionalis</i> ? Wiesner (1931)	1	0.2
<i>Lagena semistriata</i> Williamson (1848)	X	X
<i>Lagena striata</i> (d'Orbigny, 1839)	X	X
<i>Lagena</i> sp.	X	X
<i>Loxostomum bradyi</i> (Asano, 1938)	X	X
<i>Miliolinella californica</i> Rhumbler (1936)	X	X
<i>Miliolinella oblonga</i> (Montagu, 1803)	1	0.2
<i>Neoconorbina terquemii</i> (Rzehak, 1888)	X	X
<i>Nodosaria</i> sp.	X	X
<i>Nonionella basispinata</i> (Cushman & Moyer, 1930)	1	0.2
<i>Nonionella digitata</i> Nervang (1945)	X	X
<i>Nonionella stella</i> Cushman & Moyer (1930)	4	0.8
<i>Oolina acuticosta</i> (Reuss, 1862)	X	X
<i>Oolina melo</i> d'Orbigny (1839)	1	0.2
<i>Oolina striatopunctata</i> (Parker & Jones, 1865)	X	X
<i>Oolina</i> sp.	X	X
<i>Planulina exorna</i> Phleger & Parker (1951)	3	0.6
<i>Polymorphina charlottensis</i> Cushman (1925)	X	X
<i>Poroeponides cribrorepandus</i> Asano & Uchio (1951)	X	X
<i>Pullenia salisburyi</i> Stewart & Stewart (1930)	X	X
<i>Pyrgo depressa</i> (d'Orbigny, 1826)	X	X
<i>Pyrgo murrhina</i> (Schwager, 1866)	X	X
<i>Quinqueloculina akneriana</i> d'Orbigny (1846)	2	0.4
<i>Quinqueloculina elongata</i> Natland (1938)	4	0.8
<i>Quinqueloculina stalkerii</i> Loeblich & Tappan (1953)	3	0.6
<i>Quinqueloculina</i> spp.	4	0.8
<i>Robertina charlottensis</i> (Cushman, 1925)	1	0.2
<i>Rosalina globularis</i> d'Orbigny (1826)	9	1.8
<i>Rotorbinella turbinata</i> (Cushman & Valentine, 1930)	5	1.0
<i>Sigmomorphina trilocularis</i> (Bagg, 1912)	X	X
<i>Tricohyalus ornatissima</i> (Cushman, 1925)	1	0.2
<i>Trifarina angulosa</i> (Williamson, 1858)	28	5.7
<i>Triloculina tricarinata</i> d'Orbigny (1826)	1	0.2
<i>Ovigerina juncea</i> Cushman & Todd (1941)	5	1.0
<i>Ovigerina peregrina</i> Cushman (1923)	X	X
Others	5	1.0
Total benthic specimens	494	
PLANKTIC		
<i>Globigerina bulloides</i> d'Orbigny (1826)	194	45.5
<i>Globigerina quinqueloba</i> Natland (1938)	24	5.6
<i>Globigerina umbilicata</i> Orr & Zaitzeff (1971)	2	0.5
<i>Globigerinita glutinata</i> (Egger, 1893)	27	6.3
<i>Globigerinita uvula</i> (Ehrenberg, 1861)	X	X

Species (cont'd)	Raw Count	Percentage Count
<i>Globorotalia inflata</i> (d'Orbigny, 1839)	X	X
<i>Globorotalia scintula</i> (Brady, 1882)	3	0.7
<i>Globorotalia truncatulinoides</i> (d'Orbigny, 1839)	X	X
<i>Neogloboquadrina pachyderma</i> B. Kennett, Rozo-Vera & Machain Castilio (2000)	153	35.9
<i>Neogloboquadrina pachyderma pachyderma</i> (Ehrenberg, 1861)	10	2.3
<i>Orbulina universa</i> d'Orbigny (1839)	X	X
Others	5	1.2
Total planktic species	426	

Appendix: Locality data

Field Sample No.: CoBa-2-90, USGS Cruise Locator F-8-90-NC, Station 49-7. Dredge between 215 m and 155 m, from west to east on the west flank of Cordell Bank, Marin Co., California. Latitude: 38.5383°N to 38.0565°N, longitude 123.5218°W to 123.5140°W.

Field Sample No.: CoBa-3-90 dredge 2, USGS Cruise Locator F-8-90-NC, Station 49-2. Dredge between 100 m and 89 m, from east to west on the east flank of Cordell Bank, Marin Co., California. Latitude: 37.9988°N to 37.9995°N, longitude 123.3720°W to 123.3822°W.

Field Sample No : CoBa-3-90 dredge 3. USGS Cruise locator F-8-90-NC, Station 49-2. Dredge between 100 and 89 m, from west to east on the east flank of Cordell Bank, Marin Co., California. Latitude: 37.9995°N to 37.9988°N, longitude 123.3822°W to 123.3720°W.

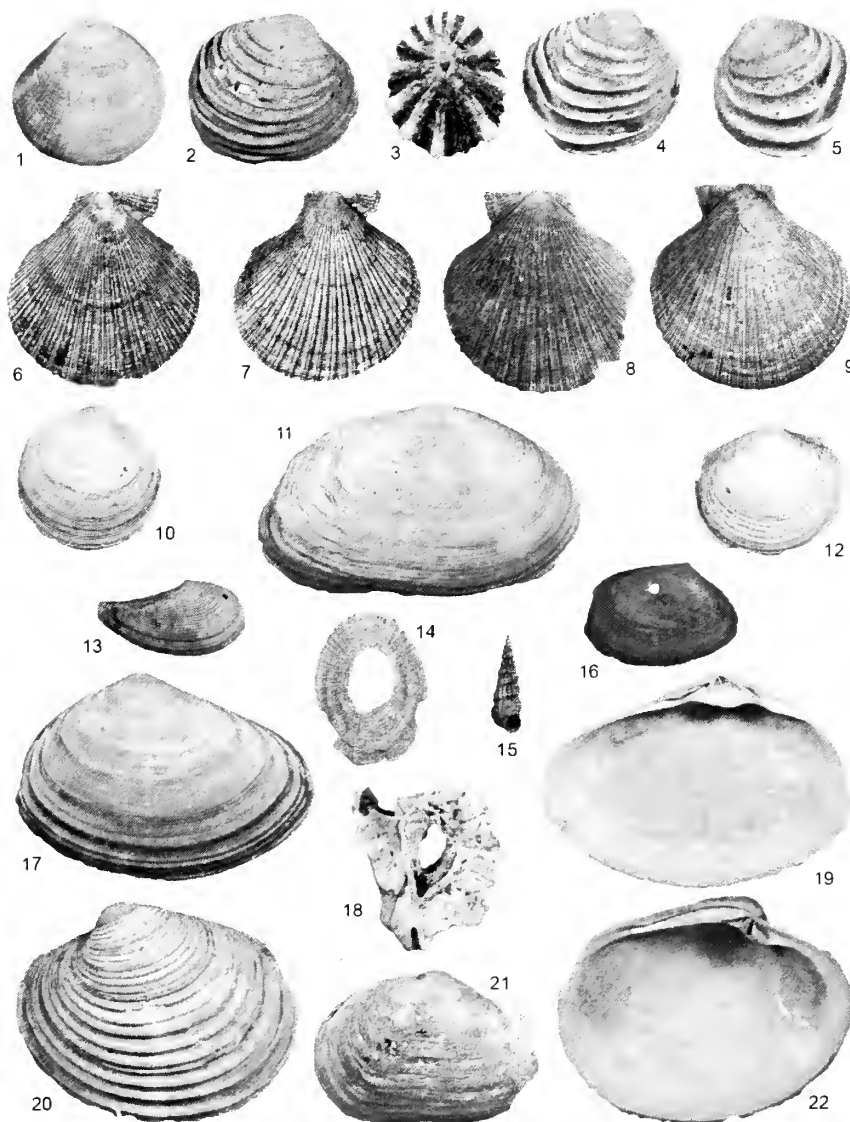


Plate 1. Figures 1-22. Mollusks (1) *Glycymeris septentrionalis*. Exterior, left valve. UCMP locality IP 367. UCMP hypotype 56040; height 28.4 mm, length 28.6 mm. (2) *Protothaca staminea*. Exterior, right valve. UCMP locality IP 367. UCMP hypotype 56057; height 40.7 mm, length 45.8 mm. (3) *Lottia scabra*. Exterior. UCMP locality IP 367. UCMP hypotype 56028; height 28.9 mm, width 24.5 mm. (4-5) *Irus lamellifer*. (4) Exterior, right valve. UCMP locality IP 637. UCMP hypotype 56058; height 36.4 mm, width 40.4 mm. (5) Exterior, left valve. UCMP locality IP 367. UCMP hypotype 56058, height 26.1 mm, length 25.7 mm. (6-9) *Chlamys rubida*. (6) Exterior, right valve. UCMP locality IP 636. UCMP hypotype 56095, height 56.7 mm, width 55.3 mm. (7) Exterior, right valve. UCMP locality IP 636, UCMP hypotype 56094; height 69.8 mm, width 68.6 mm. (8) Exterior, left valve. UCMP locality 636. UCMP hypotype 56096; height 59.1 mm, width 56.6 mm. (9). Exterior, left valve. UCMP locality IP 636. UCMP hypotype 56097, height 67.8 mm, width 65.9 mm. (10) *Epilucina californica*. Exterior, right valve. UCMP locality IP 367. UCMP hypotype 56038; height 34.6 mm, length 34.2 mm. (11) *Gari californica*. Exterior, right valve. UCMP locality IP 367. UCMP hypotype 56053; height 41.9 mm, length 69.4 mm. (12) *Lucinoma annulata*. Exterior, right valve. UCMP locality IP 637. UCMP hypotype 56024; height 25.3 mm, length 29.2 mm. (13) *Nuculana pernula*. Exterior, left valve. UCMP locality IP 636, UCMP hypotype 56091; height 6.1 mm, length 11.6 mm. (14) *Diodora aspera*. UCMP locality IP 367. UCMP hypotype 56052; height 33.8 mm, width 25.0 mm. (15) *Buttium* sp. Apertural view. UCMP locality IP 636. UCMP hypotype 56078; height 11.4 mm, width 3.4 mm. (16) *Macoma elimata*. Exterior, right valve. UCMP locality IP 636. UCMP hypotype 56090; height 10.7 mm, length 15.6 mm. (17, 19) *Sinomaestra falcata*. (17) Exterior, left valve. (19) Interior, right valve. UCMP locality UCMP IP 637. UCMP hypotype 56034; height 43.6 mm, length 62.2 mm. (18) *Ceratosoma* sp. Apertural view. UCMP locality IP 637. UCMP hypotype UCMP 56025; height 31.4 mm, width 27.8 mm. (20, 22) *Humularia kenneleyi*. (20). Exterior, left valve. (22) Interior, left valve. UCMP locality IP 637. UCMP hypotype 56042; height 43.3 mm, length 55.8 mm. (21) *Mya truncata*. Exterior, right valve. UCMP locality IP 637. UCMP hypotype 56036; height 52.5 mm, length 77.5 mm.

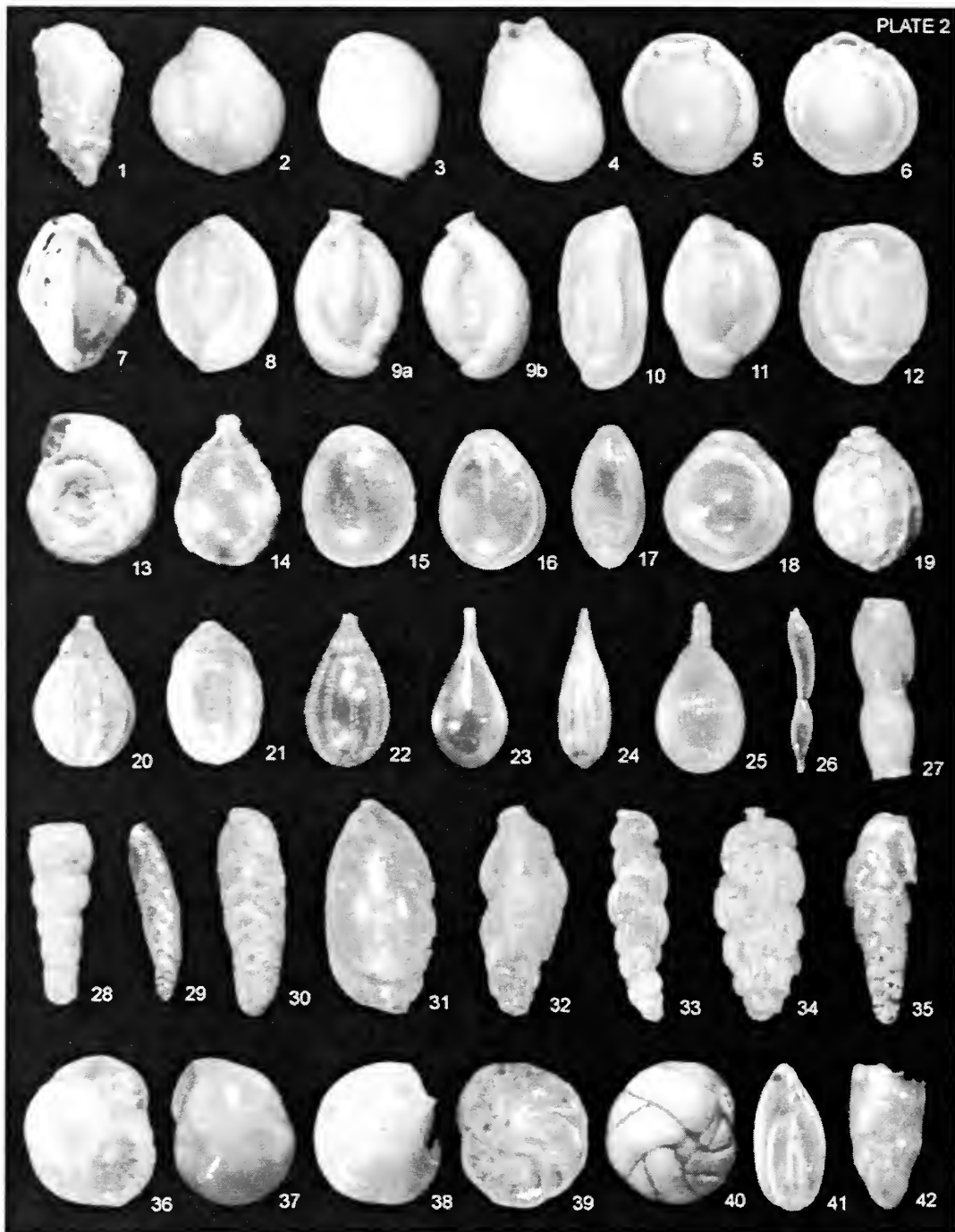


Plate 2. Figures 1-42. Benthic foraminifers. All specimens from sample CoBa-2-90. (1) *Gaudryina arenaria*, x41. (2) *Miliolinella californica*, side view, x66. (3) *Miliolinella californica*, apertural view, x66. (4) unknown calcareous imperforate, x79. (5) *Pyrgo depressa*, x55. (6) *Pyrgo murrhina*, x53. (7) *Triloculina tricarinata*, x74. (8) *Quinqueloculina akneriana*, x48. (9a) *Quinqueloculina stalkerii*, front view, x64. (9b) *Quinqueloculina stalkerii*, back view, x64. (10) *Quinqueloculina elongata*, x97. (11) *Quinqueloculina* sp., x49. (12) *Quinqueloculina* sp., x64. (13) *Cornuspira foliaceae*, x41. (14) *Fissurina serrata*, x82. (15) *Fissurina marginata*, x96. (16) *Fissurina marginata*, x93. (17) *Fissurina lucida*, x63. (18) *Fissurina orbignyana*, x118. (19) *Oolina melo*, x169. (20) *Oolina acuticosta*, x100. (21) *Oolina* sp., x87. (22) *Oolina striatopunctata*, x82. (23) *Lagena laevis*, x50. (24) *Lagena meridionalis*?, x83. (25) *Lagena striata*, x69. (26) *Dentalina itai*, x46. (27) *Dentalina* sp., x61. (28) *Nodosaria* sp., x57. (29) *Bolivina pacifica*, x56. (30) *Bolivina spissa*, x55. (31) *Globobulimina auriculata*, x49. (32) *Trifarina angulosa*, x78. (33) *Uvigerina juncea*, x42. (34) *Uvigerina peregrina*, x61. (35) *Loxostomum bradyi*, x44. (36) *Globocassidulina subglobosa*, x100. (37) *Cassidulina californica*, x33. (38) *Cassidulina tortuosa*, x46. (39) *Cassidulina limbata*, x52. (40) *Cassidulina* sp., x60. (41) *Sigmomorphina trilocularis*, x44. (42) *Polymorphina charlottensis*, x29.

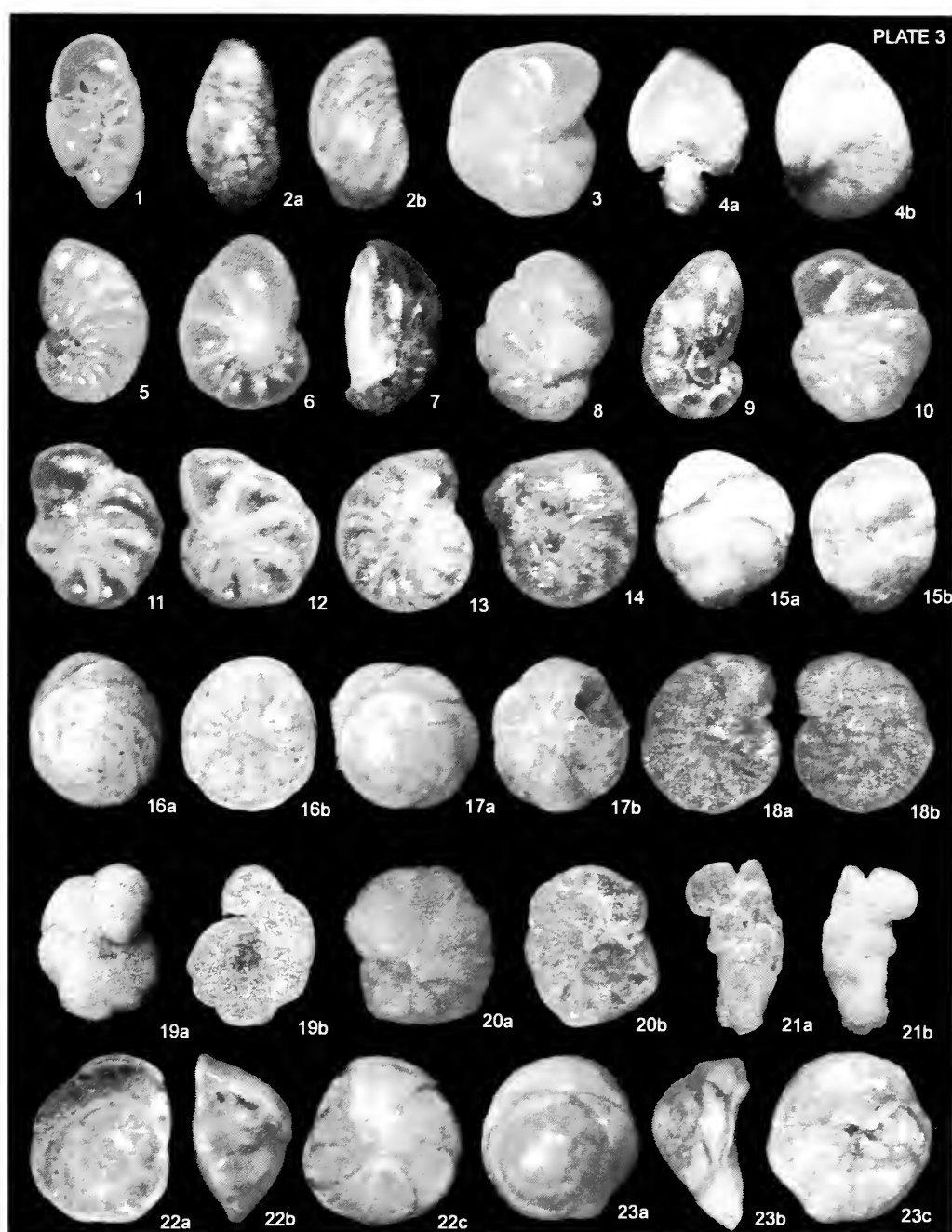


Plate 3. Figures 1-23c. Benthic foraminifera. All specimens from sample CoBa-2-90. (1) *Robertina charlottensis*, x78. (2a) *Buliminella elegantissima*, front view, x160. (2b) *Buliminella elegantissima*, back view, x160. (3) *Pullenia salisburyi*, x71. (4a) *Florilus labradoricus*, apertural view, x64. (4b) *Florilus labradoricus*, side view, x64. (5) *Nonionella basispinata*, x60. (6) *Nonionella stella*, x84. (7) *Nonionella digitata*, with collapsed last chamber, x84. (8) *Cancris auricula*, x56. (9) *Cancris inaequalis*, x23. (10) *Astrononion gallowayi*, x68. (11) *Elphidium excavatum* var. *selseyensis*, x55. (12) *Elphidium excavatum* var. *selseyensis*, x58. (13) *Elphidium excavatum* var. *clavatum*, x107. (14) *Elphidium excavatum* var. *clavatum*, x121. (15a) *Poroepionides cribreropandus*, dorsal view, x63. (15b) *Poroepionides cribreropandus*, ventral view, x63. (16a) *Buccella frigida*, dorsal view, x52. (16b) *Buccella frigida*, ventral view, x52. (17a) *Buccella frigida*, dorsal view, x81. (17b) *Buccella frigida*, ventral view, x81. (18a) *Cibicides* sp., dorsal view, x49. (18b) *Cibicides* sp., ventral view, x49. (19a) *Cibicides lobatulus*, dorsal view, x30. (19b) *Cibicides lobatulus*, ventral view, x30. (20a) *Cibicides lobatulus*, dorsal view, x54. (20b) *Cibicides lobatulus*, ventral view, x54. (21a) *Dyocibicides biserialis*, ventral view, x28. (21b) *Dyocibicides biserialis*, dorsal view, x28. (22a) *Epistominella pacifica*, dorsal view, x82. (22b) *Epistominella pacifica*, edge view, x82. (22c) *Epistominella pacifica*, ventral view, x82. (23a) *Rotorbinella turbinata*, dorsal view, x88. (23b) *Rotorbinella turbinata*, edge view, x91. (23c) *Rotorbinella turbinata*, ventral view, x91.

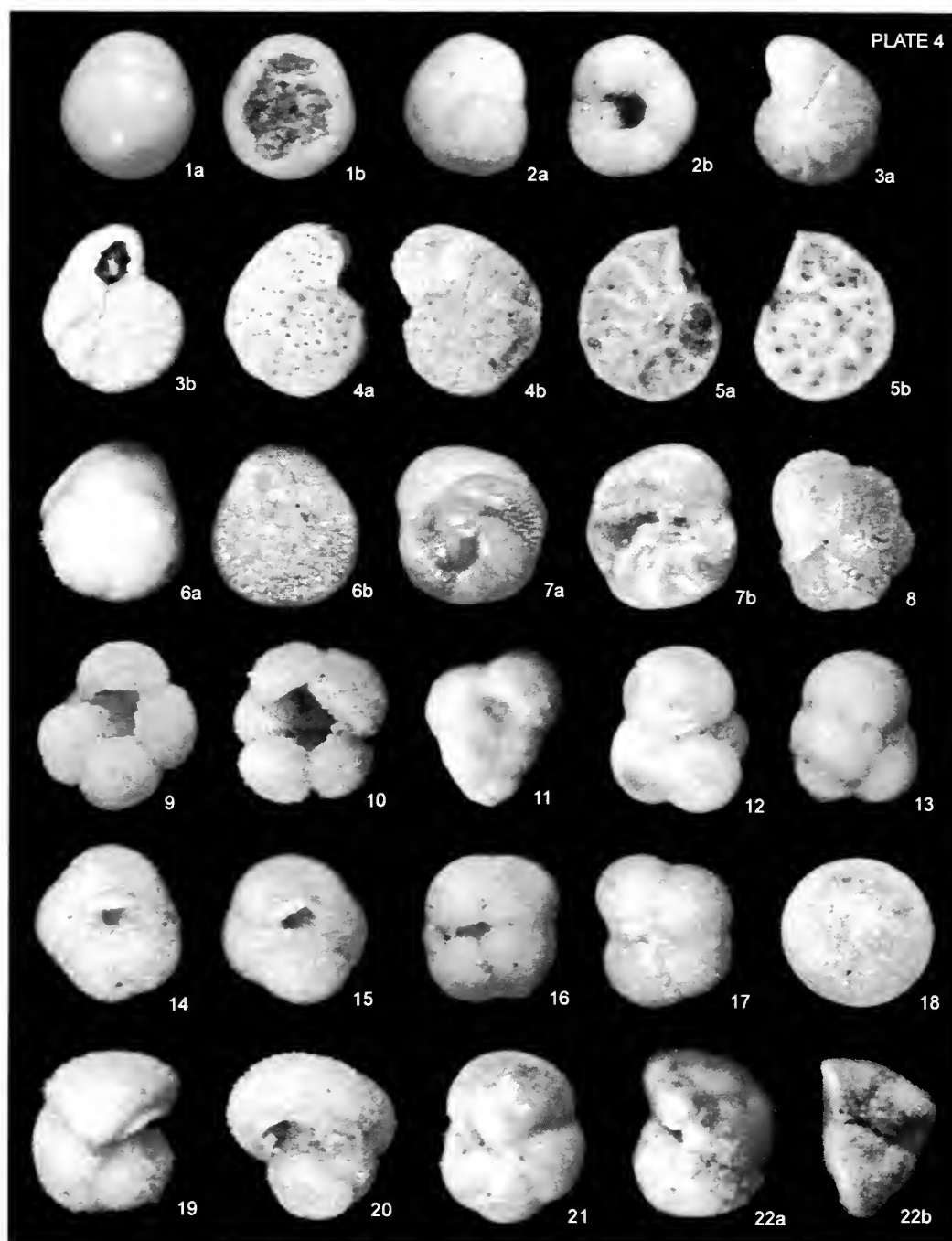


Plate 4. Figures 1a-22b. Benthic foraminifers (1-7), Planktic foraminifers (8-22). All specimens from sample CoBa-2-90. (1a) *Glabratella californiana*, dorsal view, x75. (1) *Glabratella californiana*, ventral view, x75. (2a) *Glabratella californiana*, dorsal view, x100. (2b) *Glabratella californiana*, ventral view, x100. (3a) *Cibicides fletcheri*, dorsal view, x53. (3b) *Cibicides fletcheri*, ventral view, x59. (4a) *Planulina exorna*, ventral view, x72. (4b) *Planulina exorna*, dorsal view, x72. (5a) *Planulina exorna*, dorsal view, x100. (5b) *Planulina exorna*, ventral view, x100. (6a) *Trichohyalus ornatissima*, dorsal view, x83. (6b) *Trichohyalus ornatissima*, ventral view, x83. (7a) *Rosalina globularis*, dorsal view, x59. (7b) *Rosalina globularis*, ventral view, x61. (8) *Globigerina quinqueloba*, x112. (9) *Globigerina bulloides*, x74. (10) *Globigerina umbilicata*, x64. (11) *Globigerinita uvula*, x264. (12) *Globigerinita glutinata*, x100. (13) *Globigerinita glutinata*, with bullae covering umbilicus, x122. (14) *Neogloboquadrina pachyderma* B, x104. (15) *Neogloboquadrina pachyderma* B, x96. (16) *Neogloboquadrina pachyderma pachyderma*, x100. (17) *Neogloboquadrina pachyderma pachyderma*, x108. (18) *Orbulina universa*, x59. (19) *Globorotalia inflata*, x85. (20) unknown, x76. (21) *Globorotalia scitula*, x131. (22a) *Globorotalia truncatulinoides*, ventral view, x79. *Globorotalia truncatulinoides*, edge view, x74.



THE FESTIVUS

A publication of the San Diego Shell Club

ISSN 0738-9388

Volume: XL

October 9, 2008

Number: 10

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Membership (includes family). Domestic \$20.00;
Overseas (air mail): \$40.00; Mexico/Canada (air mail): \$30.00.

Address all correspondence to the San Diego Shell Club, Inc.,
c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111, USA.

The Festivus is published monthly except December.
The publication date appears on the masthead above.
Single copies of this issue: \$5.00 plus postage.

Meeting date: third Thursday, 7:30 PM.
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PROGRAM

CHITONS COLLECTED BY DAVID AND MARGARET MULLINER IN THE NORTHERN GULF OF CALIFORNIA

Douglas Eernisse of California State University, Fullerton, whose longtime interest is in Chitons will give a PowerPoint program highlighting species collected by the Mulliners in the Gulf of California, México.

Meeting date: October 16, 2008

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CLUB NEWS

The Club's Annual September Party September 13, 2008

How was the party, you ask? It was great! About 25 very friendly people attended. Most arrived at just about 4 pm (so they wouldn't miss anything). Everyone so happy to see everyone else and the conversations never stopped. The food, as is usual, was wonderful and the hosts, Debbie and Larry Catarius, had prepared their garden for the event and it was both beautiful and very comfortable.

Our biggest thanks to them both for once again hosting this annual September party.

First Announcement for Next Year's Annual SCUM Meeting

The thirteenth annual meeting of the Southern California Unified Malacologists (SCUM) will take place on the campus of California State Polytechnic University in Pomona, California, on January 24th, 2009. For directions and other information please check out this website which will be updated with more information: <http://mollusks1.sci.csupomona.edu/scum> as the date comes closer.

If you are planning to attend please e-mail as soon as you know, particularly if you intend to give a talk. I hope to see you in January.

Ángel Valdés, Department of Biological Sciences, California State Polytechnic University, 3801 West Temple Avenue, Pomona, California 91768-4032. Office phone: (909) 869-4064, Lab phone: (909) 869-3005.

First Notice of 2009 Conchologists of America Convention

The Suncoast Conchologists of Clearwater, Florida is hosting the 2009 COA Convention from July 19-23, with Pre-Convention Field Trips on July 18. The theme is *Cruising the Suncoast*...an imaginary cruise aboard the *Silver Alatus* with the "ship" being the Hilton Clearwater Beach Resort located on Florida's Gulf coast. The special cruise rate is \$159.00 + 12% tax for up to 4 persons per room with a king bed or two doubles. This rate is available 3 days prior to and 3 days after the convention. You can book a "stateroom" online now at www.clearwaterbeachresort.com through June 22, 2009 by entering the Group Convention ID Code: SHELGS. Or, by phone, call 1-727-461-3222 or 1-800-753-3954. You MUST mention that you are with Conchologists of America.

First Notice of 2009 Western Society of Malacologists (WSM) Meeting

Incoming president Michael Vendrasco has announced that the upcoming annual meeting will be Wednesday, June 24 through Saturday, June 27, 2009 at California State University, Fullerton. Several symposia are planned, one on molluscan conservation and one on early molluscan evolution. It is hoped that there will be a workshop as well. The meeting will close with a field trip to Catalina on Saturday, June 27th. There will be more details about the conference as plans are finalized.

IN MEMORIAM

LINDA LAGRANGE

Linda passed away early in the morning on

Wednesday, October 1st, 2008.

We will miss her greatly.

OBSERVATIONS AND BIOLOGY OF *NEOSIMNIA BARBARENSIS* AND ITS SEA PEN HOST IN MISSION BAY, SAN DIEGO, CALIFORNIA

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Introduction

In San Diego, three species of gorgonians occur in the rocky habitat adjacent to the Mission Bay Channel. *Muricea californica* and *Muricea fruticosa* are very abundant, while *Lophogorgia chilensis* is present but uncommon in the same rocky habitat. Despite two years of examining gorgonians, no *Neosimnia vidleri* (Sowerby, 1881) have been observed. On March 21, 2008, while making a drift dive over a sand bottom, a male and two female *Neosimnia barbarensis* (Dall, 1892) were found on a sea pen lying on the bottom. Finding this species of *Neosimnia* was unexpected, as collecting records and literature place the habitat at between 40 and 200 meters [Cate (1973), Mclean & Gosliner (1996), and Hertz (1984)]. Figure 1 illustrates a male and female *N. barbarensis* and associated egg clusters.

Cate (1973), in his work on the Ovulidae provides a good description of the *N. barbarensis* shell and historic information regarding the status of the holotype. Carole Hertz (1984) collected a single, empty *N. barbarensis* shell during a minus tide in sand at Ski Beach on Vacation Isle, and published photographs. She reviewed the available information and concluded that the occurrence of this deep water species in Mission Bay was "a mystery."

Although *Neosimnia* are generally thought to feed on gorgonian corals, records from trawled specimens also associate this species with sea pens. Mclean & Gosliner (1996), mention the occurrence of *N. barbarensis* on gorgonians and in association with a sea plume (sea pen) in the genus *Ptiloscarus*. Field data from two specimens trawled at 100 fathoms (ca 182 m) off La Jolla indicated it was associated with sea pens (Jules & Carole Hertz Collection). In general, the association between the snail and sea pens is not widely known. Finding a population at depths of 3 to 6 meters presented an opportunity to make in situ observations. During subsequent dives we were able to observe, measure and photograph numerous individuals and pairs on each dive

and document the snail-host interactions.

Sea pens are in the phylum Cnidaria (formally Coelenterata), class Anthozoa, and order Pennatulacea. Like gorgonians they are octocorals with eight tentacles per polyp, but their appearance and biology is strikingly different. In Mission Bay, we found sea pens and snails at depths of 3 to 6 meters on sand in the main channel or in sand with sediment adjacent to the channel. The base of the pen is the peduncle, which is a slow moving "foot" that burrows into the substrate, and holds the pen against the current. The rachis, the above-sand stalk of the animal, holds the feeding polyps upright in the current. The species of sea pens found in our study area can be feathery (*Acanthoptilum* sp.), plumose (*Virgularia californica*), or bottlebrush in appearance (*Stylatula* sp.). Both *Virgularia* and *Stylatula* can withdraw into the sand to avoid predators or when struck by debris. The third species *Acanthoptilum* sp. may exceed 40 cm in length, and the rachis is of fixed length; therefore, the animal is unable to retreat into the sand when disturbed or attacked. *Acanthoptilum* is the most common species of sea pen (Figure 2) in the channel, and the only species on which we have found *N. barbarensis*.

Methods.

Between mid-March and May of 2008, two to three dives were made per week, with the duration of each dive ranging from 60 to 80 minutes on the bottom. Snail length was measured with Fowler calipers. The diameter of the animals could not be accurately measured while diving as the shell is elliptical and the lip fragile. Twelve individuals of each sex were brought to the shore and measured; some were retained and the majority released back into their habitat. While diving, data were recorded on underwater writing pads. Egg masses were counted twice and the average recorded. Based on the recount of egg masses on the shore, our in situ counting underestimated the number by 3%. Sea pens with attached eggs were then returned to the habitat and the

peduncle buried in the sand. Underwater photos and video were taken to assist with the documentation of observations.

Observations

The snails are considered to be parasites, as they feed, mate, live and reproduce on the host sea pens. Only one age class of snails was present on the sea pens, mature adults. The length of 12 female *N. barbarensis* ranged from 33.2 mm to 40.8 mm with an average length 35.9 mm, and a standard deviation of 2.1 mm. Twelve males ranged in length from 29 mm to 32.2 mm, with an average length of 31.3 mm and a standard deviation of 1.1 mm. The size range reported in the literature is 25-30 mm (sex not identified (McLean, 1996; Cate, 1973)). Males, in addition to being smaller, have more orange on the mantle and the black spots are often strongly contrasting (Figure 1). The shell of the male is sturdy, often more pigmented; the anterior and posterior apices of the shell are orange and more prominently colored than those of the females; and the lip of the male is thicker with a white margin. The ground color of female shells is light brown with a light pink cast and is often translucent; the shell of the males often has more pink. The mantle is as colorful as those of *Cyphoma* from the Caribbean. Perhaps 5% of the adult *N. barbarensis*, have melanistic tendencies, with the siphon tube and foot black (Figure 3). On occasion, the mantle of these individuals may have large black spots.

Adult snails are found on the rachis of the sea pen, typically in the area where the feeding polyps are present. Snails occur individually, in pairs, or on occasion, one male and two females are present. Pairs of snails were present, and females were already depositing eggs on sea pens, when we began making observations in March 2008.

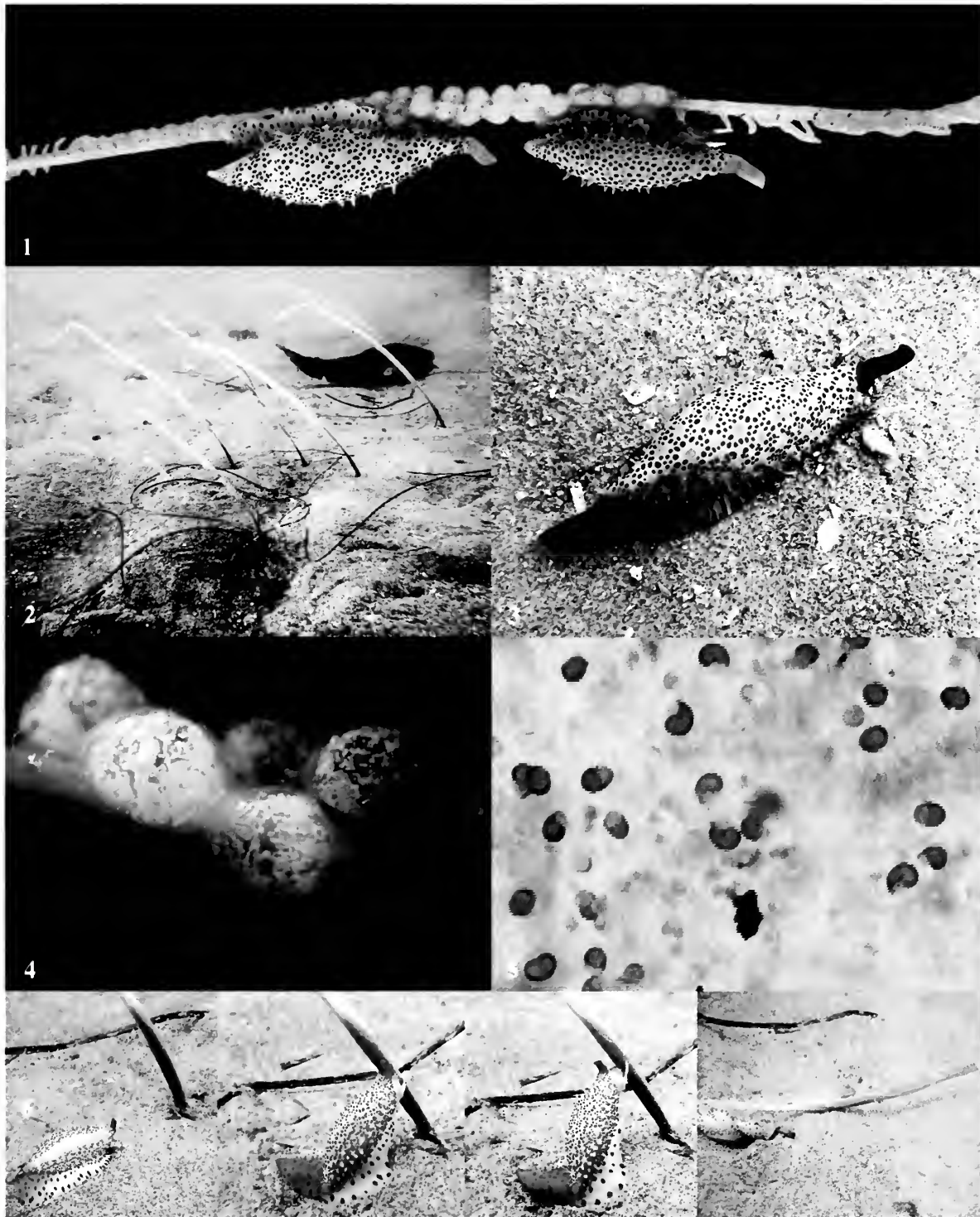
Females deposit egg masses on the rachis among feeding polyps, often above the midpoint of the protruding sea pen. Egg cases are 3 mm in diameter, globular in appearance, and covered by a firm but transparent membrane (Figures 1, 4). The egg clusters are deposited in a ring around the rachis and adhere to each other. One female collected on a pen with 15 egg clusters, deposited an additional 38 clusters within 24 hours for a total of 53, and after 48 hours 67 were present in one continuous cluster. The male may remain with the female or wander off. The female remains with the eggs and cleans the surface of each egg case as she moves up and down the egg mass. It is not known how many times females mate and form egg clusters on other sea pens.

The eggs and developing embryos are free floating within the egg case and can be seen with a dissection scope at 40 to 50 magnification (Figure 4). Eggs were estimated to be 0.07 mm in length and slightly oblong. One egg cluster, that was 24 hours old was opened so that the eggs and embryos could be counted, and it was found to contain 1615 embryos/eggs. If this number is typical, the female with 67 clusters would have deposited over 108,000 eggs. As cell division continued, the open space inside the egg case fills with developing motile larvae. At three weeks some egg clusters were brown and filled with active larvae each with a microscopic protoconch (Figure 5). Other clusters in the same batch did not reach this developmental stage until the 6th week. The larvae move via cilia on the protruding body of the animal. When the larvae hatch, they are planktonic and, as such, drift away in the current.

Based on the number of unattended egg masses found, adults may abandon the live sea pen after providing some initial care to the eggs. It is unlikely that an individual sea pen can support the feeding pressure of multiple adult snails. Exiting sea pens where they have deposited eggs may be an adaptation to insure the eggs have a suitable habitat until they hatch. Badly damaged or dead pens come free from the sand, and the axial rods (the shaft inside the rachis), can be found in depressions. It is likely that eggs on sea pens that die, may not survive.

On occasion, adult snails were observed crossing sand or plant material, presumably in search of a sea pen. One such observation led to our discovery of how the sea pens attempt to escape the snails. As the snail approached the sea pen, the snail raised its shell and foot, and the head came in contact with the sea pen. Within one minute, the buried peduncle of the sea pen abruptly released from the sand, and the pen drifted away, with the snail having difficulty remaining attached (Figure 6). The first snails we found were on a pen lying on the bottom with three snails attached. Other pairs and individuals have been seen on live pens lying on the bottom. These may be sea pens that fled, but were not able to get free of the snails. The pens use the peduncle to re-position themselves in the sand.

The initial snail-sea pen interaction suggested a simple experiment. Snails were collected and placed in close proximity to the base of unoccupied sea pens. Nine out of ten times, the sea pen released its hold in the sand, and drifted successfully away from the snail that had made contact. Underwater digital video was used to capture and time the interactions. The flight response by the sea pen occurred between 13 and 115 seconds after



Figures 1-6. (1) *Neosimnia barbarensis* adults tending clusters of eggs. Female left, male right. (2) Sea pens of the genus *Acanthoptilum* sp. in habitat. (3) Adult with melanistic tendencies (dark foot and siphon, some also have larger black spots on the mantle). (4) Each globular cluster may contain over 1600 eggs or larvae. (5) Microscopic protoconchs have formed prior to the larvae exiting the egg cluster. (6) An adult *N. barbarensis* displaying the non-subtle approach to attacking a sea pen. The sea pen exits the sand to drift away. The snail is dragged over the sand and about to lose its hold on the sea pen.

the snail made contact with the base of the rachis. In the one instance during which the sea pen did not escape, the video shows that the pen started to raise out of the sand but did not or could not exit. The female snail seemed to have wrapped its body around the base of the pen before climbing. Approximately 10 minutes later we returned to the sea pen, and the snail had climbed up the rachis to the feeding polyps. This interaction suggested that (1) the more subtle approach may allow the snail to pick up surface mucus of the sea pen, that successfully masked the snails' presence. Physical contact with foreign objects does not cause the sea pen to release its peduncle from the sand, suggesting a chemical interaction may trigger the sea pens response upon contact with the *Neosimnia*, (2) that the subtle approach may not be sufficient to trigger the flight response. To test the first hypothesis (that snails could mask their presence), snails were removed and immediately placed at the base of their host. Each sea pen responded to the snails presence, and all pens demonstrated the flight response after the snail made contact with the rachis.

Living on the sea pen does not give the snail any advantage on re-acquiring the same host. When new or resident snails are introduced to their host (by hand) at the level of the feeding polyps, the sea pens do not exhibit the flight response. These observations suggest that (1) the snail does not pick up mucus from the host, that masks its presence or (2) that the flight response is associated with the base of the exposed rachis (where a predator would first make contact) and not on the upper portion of the pen where the feeding polyps are present.

It is possible that the subtle approach by the snail may be successful only because the snail does not exceed the threshold to stimulate the full flight response on the part of the sea pen. Snails are also successful when the sea pen is buried too deep in the sand, and initial contact is made with the portion of the rachis supporting the feeding polyps.

As of July, no recruitment of juvenile snails had been observed, most adult snails were found as individuals rather than pairs and egg clusters were far less common. Observations will continue during the next year in order to assess recruitment and survival rates.

Acknowledgments

We thank Ron Velarde for assistance with the identification of the sea pens, and Jules and Carole Hertz for making literature and specimens available.

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GROWTH CHANGES IN *JENNERIA PUSTULATA* (LIGHTFOOT, 1786) (GASTROPODA: OVULIDAE)

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Occasionally, papers have been published on the growth changes in species, some radical, from juvenile to adult: Skoglund (2000) [*Pitar*], (2007) [*Malea ringens*, *Semicassis centiquadrata*]; Kaiser (1999) [three thaid species], (2001), [*Caducifer cinis*]; Hertz, C. (1999) [*Dermomurex obeliscus*]. Often, in examining a juvenile shell, one may think he/she has a different (and maybe even a new) species.

While working with Barbara W. Myers on the Ovulidae in the Marine Invertebrate Department of the San Diego Natural History Museum, we discovered a shell with one of these rather radical differences. We were curating specimens of *Jenneria pustulata* (Lightfoot, 1786) when we came upon a lot of one specimen (SDNHM 54086) that looked like a totally different species (Figure 1). It appeared to be a small, mature cypraeid, a shell 12 mm in length with a gray dorsum covered by fine raised spiral striae, no pustules, and divided by a mantle line. The base appeared almost mature showing the apertural teeth extending to the margin.

The mature shell of *J. pustulata* has an oval, somewhat flattened grayish dorsum with fine raised spiral lines and is covered with bright orange-red pustules, each usually circled by a dark ring and divided by a mantle line on most specimens. On the dark brown base, apertural teeth extend to the margins as yellowish to white ridges. Figure 4 illustrates two views of the mature shell of *J. pustulata* (SDNHM 25179). The 21.9 and 20.4 mm long shells show the brilliant dorsal pustules and the deeply grooved apertural teeth of the dark brown base.

Cate (1973, fig. 2a) illustrated a juvenile of *J. pustulata* with an immature base and a bulla-like appearance. Two shells resembling that specimen are

shown in SDNHM 62196 (Figure 2). These two juveniles 12.5 and 14.0 mm in length look like immature *Cypraea*. In examining additional lots of *J. pustulata* we found a specimen of 14.4 mm length (SDNHM 65016) which showed occasional, sporadic, pale yellow raised spots on the dorsum (Figure 3) and an almost mature base. This appears to be a further stage in the development of the species.

For those who are conversant with Panamic gastropods, *Jenneria pustulata* is striking. At first glance one might believe it is a *Trivia* – an exceptionally vivid one. But Schilder (1936) placed the genus in the Ovulidae because of work on the radula by Thiele (1925), and D'Asaro (1969) studied the eggs of the species and found them having pustulate capsules as in *Simnia patula* (Pennant, 1777) and *Cyphoma gibbosum* (Linnaeus 1758). He stated that they were "most similar to the processes occurring in the Ovulidae." Bouchet and Rocroi (2005) continue this placement.

As in many studies involving juveniles of a species, this was an enjoyable learning experience. The shell shown in Figure 1, right, appeared a puzzle at first (and even second) look. It helps to remember to study growth series of a species before making decisions on mystery shells.

Acknowledgments

Tom Démeré of the Department of Paleontology, San Diego Natural History Museum, was most helpful in lending me his department's copy stand, and with Sara Siren, also of the Paleo Department, in giving assistance with the photography. And to my co-worker and friend Barbara Myers my thanks for her constant support in our work on the mollusks in the Marine Invertebrate Department

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Figures 1-4. *Jenneria pustulata* (Lightfoot, 1786) (1) one 12 mm juvenile, grayish shell with dorsal mantle line, raised spiral lines and no pustules (SDNHM 54086), Bahía Montijo, Panamá. (2) two bulla-stage shells, 12.5 and 14.0 mm with raised spiral lines dorsally and no pustules. (SDNHM 62196), Rio Mar, Ecuador, leg. and donor D.R. Shasky. (3) one 14.4 mm shell with raised spiral lines and occasional pale-colored raised spots on the dorsum (SDNHM 65016), Fort Amador, Panamá, leg. and donor D.R. Shasky. (4) two mature shells, 21.9 and 20.4 mm showing the brilliant orange-red pustules on the dorsum (SDNHM 25179), Bahía Montijo, Panamá. Ex H.N. Lowe Collection.



THE FESTIVUS

A publication of the San Diego Shell Club

ISSN 0738-9388

Volume: XL

November 13, 2008

Number: 11

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Membership (includes family). Domestic \$20.00;
Overseas (air mail): \$40.00; Mexico/Canada (air mail): \$30.00.

Address all correspondence to the San Diego Shell Club, Inc.,
c/o 3883 Mt. Blackburn Ave., San Diego, CA 92111, USA.

The Festivus is published monthly except December.
The publication date appears on the masthead above.
Single copies of this issue: \$5.00 plus postage.

Meeting date: third Thursday, 7:30 PM,
Room 104, Casa Del Prado, Balboa Park, San Diego

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PROGRAM

WHAT BECOMES OF A PERSONAL COLLECTION - OR WHO GETS IT WHEN YOU GO?

Henry Chaney of the Santa Barbara Museum of
Natural History, will give a survey of the decisions,

options and ramifications when one's collection ultimately
changes ownership.

Also

GIANT BOOK AND REPRINT SALE

Meeting date: November 20, 2008

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CLUB NEWS

San Diego Shell Club Meeting Minutes 16 October 2008

The meeting was called to order at 7:35 pm by Jules Hertz. There were no minutes, as the previous meeting was the September party held at the Catarius' home. Carole Hertz gave the VP report and indicated that our November speaker will be Dr. Henry Chaney talking about what happens to your collection when you pass away. The board presented the slate of offices for next year. The officers are: President Carole Hertz, Vice President Benjamin Pister, Corresponding Secretary Marilyn Goldammer, Recording Secretary Paul Tuskes, Treasurer Silvana Vollero. Jules asked for nominations from the floor, but none were offered and the slate was accepted and approved by the members present. The new officers will be installed at the Christmas Party.

Jules announced that the Christmas party will be held at the Butcher Shop on the evening of 6 December (first Saturday) so save that date. You can select from prime rib or salmon for the dinner. Cost will be \$30 per person, which includes the full meal, wine (which is provided by the Club) and tip. The speaker for the evening will be Richard Herrmann.

Paul Tuskes told about the Mission Bay survey – the next good low tide is Sunday, the 26th of October. Let's meet at 1pm at the parking lot next to the dog run on Fiesta Island. If you arrive late, we will be working our way along the beach to the south. Low tide is at 1:55 pm. The following two days are also good tides, but since they occur on weekdays it is suggested, that if you are able to go, to try one of your favorite places.

Our speaker for the October meeting was Dr. Doug Eernisse of California State University, Fullerton. Doug discussed some of the taxonomic issues with chitons from Baja California (many from the Mulliner Collection, and illustrated many of the newly described or yet to be described species. He then reviewed some of the chiton fauna from the sea mounts off southern California. The terrific talk with innovative photographic methods produced sharp images with great depth of field and are clear.

Thirty members and guests were present. The meeting was adjourned at 8:40 pm and people enjoyed the snacks brought in by Carole Hertz, Silvana Vollero, and Ric Crumley while they visited after the meeting.

Paul Tuskes

Dues are Due

Dues for 2009 are due and payable now. The domestic rate will remain the same at \$20 but, as reported earlier, non-domestic rates will be raised as a result of the several increases in postage. Rates for Mexico and Canada will be \$30 and subscriptions for all other countries will be \$40.

Please return the enclosed colored dues slip even if your address, e-mail or phone numbers haven't changed.

The Club's Annual Christmas Dinner Party

The Club's annual Christmas Dinner Party will be held on Saturday evening December 6th at 6 pm with no host cocktails. Dinner will be served promptly at 7 pm.

The menu offers a choice of entree – either an 9 oz Prime rib of beef with garlic mashed potatoes and fresh vegetables or Sauteed fillet of salmon topped with dill buerre blanc and served with garlic mashed potatoes and fresh vegetables.

The meal begins with a mixed green salad with choice of several dressings and rolls and butter. Following the entree, dessert and coffee or tea will be served. The dessert will be Apple streusel cheesecake.

The speaker for the evening is to be Richard Herrmann who always gives a fantastic program. Following that will be the traditional gift exchange. Each person is asked to bring a shell or related shell gift wrapped with only very general location on the outside – i.e. Atlantic, eastern Pacific, Caribbean etc.

Cost of the evening with dinner including wine and tip will be \$30. Do mark your calendars and plan to attend. It is always a very special evening.

Come to the Giant Book and Reprint Sale

In conjunction with the November meeting (with Henry Chaney's important and entertaining talk), there will be the Club's annual giant book and reprint sale. The Club usually holds this BIG sale in November to help members start their holiday purchases and, in so doing, add to the Club's ability to purchase future worthwhile library books. Come and take a look and add to your own library.

THE PITCAIRN AND HENDERSON ISLANDS TRIP

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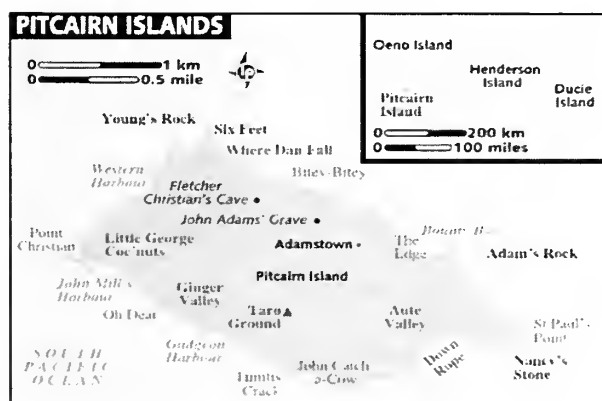
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It is a long way to travel, a long time at sea to visit Pitcairn (Map 1) and Henderson Islands (Map 2) – west of Easter Island, southeast of French Polynesia and east of New Zealand. Is it worth the effort? Seizing the opportunity to find out and fulfill a long held dream, we booked ourselves on a 12-day trip aboard the R/V *Bounty Bay* to both islands.

The two islands part of the Pitcairn Group, which also includes the Oeno and Ducie Atolls as well as a large seamount, reported to be approximately 40 miles ESE of Pitcairn, are administered by Great Britain and are as isolated as any island can be. They are also a study in contrasts.



Map 1. Pitcairn Island and the Pitcairn Group.

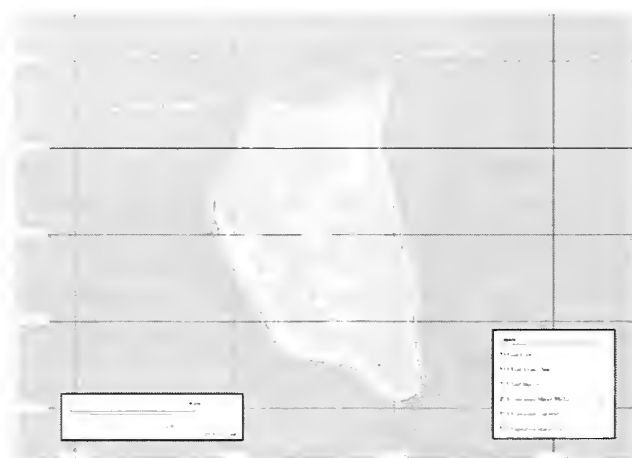
Pitcairn is a small volcanic island, irregular and somewhat oval in shape with a land mass of approximately 1.75 square miles (Figures 1-6, 14). There are no landing beaches and the island has no fringing or barrier reefs to protect it from the almost constant pounding from ocean swells. A small landing slip has been constructed at Bounty Bay, approximately

50 meters from the final resting place of HMS *Bounty* (Figures 6, 9) and it is from this slip that the Long Boats go out to meet passing ships to unload cargo and passengers (Figures 4, 5). There are about 50 residents, most of whom are descended from the original mutineers and the Tahitians who accompanied them. There are no tourist facilities and written permission from the local government is required to visit the island. So, those wishing to stay on the island must arrange to stay with one of the local families.

The underwater terrain reflects the island and the surrounding ocean. The shoreline consists mainly of narrow rock ledges interspersed with narrow sections of rock beach. The constant swells make access to these areas feasible only during good weather and low tide. The swells and storms with their constant sweeping action have also resulted in a rather barren bottom. Coral growth is sparse and limited to isolated clumps and patches. There is also very little of the rubble, normally so productive for shell collecting, even at 20 meters and deeper. Rather, the bottom drops to about 5 – 10 meters and then slopes gradually seaward. The bottom consists of rock substrate, covered with algae, interspersed with sand gullies and patches.

Henderson is an uplifted coral island located 120 miles northeast of Pitcairn. It is approximately 6 miles long and 3.5 miles wide, oriented roughly in a north/south direction with the east side being slightly crescent-shaped. The island has the appearance of a huge escarpment. With the exception of the NW and SW sections, the west side consists of cliffs, 35 – 40 meters in height, with virtually no access to the top of the island. The west is subject to constant open ocean swells and storms, creating impressive surge activity close to shore. The northwest is the traditional overnight anchorage for Pitcairn Islanders and research vessels.

and old mooring chains can be found on the bottom. It and the southwest section have narrow sandy beaches. The east coast is not subject to the big swells of the west coast. Rather, it consists mainly of sand beaches and the beginnings of a fringing reef just offshore. The island is uninhabited, although a Polynesian society did live on the island until about 600 years ago. The existence of endemic species consisting of four land birds, a number of plants and land snails as well as one butterfly, have earned the island World Heritage status. Henderson also



Map 2. Henderson Island

played a significant role in the ordeal of the survivors of the sinking of the whaling ship *Essex* in 1820.

The coral life is more prolific at Henderson than at Pitcairn, although that is relative. The west side near shore consists of deep gullies, overhangs and swim-throughs with the surge making diving hazardous. The bottom, quite flat and covered with low profile corals, then slopes quite steeply to well beyond sport diving depths. There are shallow gullies with little rubble, and there is an absence of overhangs and caves, creating a somewhat monotonous terrain. The island produces very little runoff and visibility is excellent: up to 40-60m. The east side has better coral and a less severe bottom profile, but we were not able to dive here.

The *Bounty Bay* is not a fast boat (Figures 3, 5): its normal cruising speed is 5-5.5 knots. So, with the distances to be traveled, the time on site is limited. The distances traveled on the ocean were approximately 800 miles, so one can estimate our hours/days at sea: sleeping, reading, computers, etc. We spent a half day at Oeno Atoll with marginal diving conditions due to high surf, three days total at Pitcairn, a day and a half at Henderson and a day and a half in the vicinity of the

Gambier Islands. The *Bounty Bay* was built as a research vessel and that remains its primary function with about half of its charters to government organizations and universities doing surveys and environmental work (e.g. rat eradication and flora/fauna studies). Living and work spaces are spartan but adaptable. The boat is capable of supporting scuba diving activity, but it cannot be considered a dive boat per se.

Our trip was meant as a dive charter and the other divers were capable, but casual sport divers. As such, dives were oriented toward general interest rather than shell collecting. Also, night diving was not offered due to the remote locations and swells. With these limitations, divers were free to dive their own profiles. A total of twelve dives were made at Oeno Atoll, Bounty Bay and West Harbour, Pitcairn, northeast and west coasts of Henderson and Temoe Atoll (near Gambier Island).

We were very lucky on our last day at Pitcairn Island. The seas were unusually calm and we were able to anchor in Bounty Bay: a very rare occurrence. Normally, boats and cruise ships anchored at Tedside (an abbreviation for "the other side" dated from the early mutineers) at West Harbour. By anchoring in Bounty Bay, we were able to dive on both the *Cornwallis* and the *HMS Bounty*. Both are in very shallow water: 2-8m. The *Cornwallis* lost anchorage in the late 1800s and drifted into rocks and sank. There is still considerable wreckage on the bottom: remaining hull plates as well as five huge anchors (Figure 11). The few remains of the *Bounty* are about 100 m away; only a few blocks of ballast are seen (Figure 9). The surge is considerable in these areas, making photography difficult, but this day allowed very good visibility and some nice pictures (Figures 8, 13, 15). That night it rained heavily, so the next morning, the seas in the Bounty Bay were muddy brown! We were indeed lucky on our dives the day earlier!

In addition to the dives, we were able to acquire some shells from two Pitcairn Island families, speak with a local Pitcairn Island diver about his activities and view a number of shells in the local museum. The junior author was able to get a beautiful Harp shell that had been collected in lobster traps by the Pitcairneers in the 1990s in about 60 fm. It has been identified as *Harpa* (Figure 12) normally found in the Hawaiian Island chain.

The shells we collected were, with a few exceptions, very fresh dead (Figure 10). Shells are there, but appear restricted in terms of diversity and quantity. Habitats are hard to access due to the need for

protection from the strong ocean swells and waves. It would appear that this area represents the outer distribution limit for most species and, as such, the number of species and number of specimens appear limited.

The senior author's interest is primarily focused on *Cypraea* and he was able through the above methods to confirm the existence of a number of species at Pitcairn and Henderson Islands.

Following is a list for each *Cypraea* species found at these islands.

<u>PITCAIRN ISLAND</u>	<u>HENDERSON ISLAND</u>
<i>caputserpentis</i>	<i>caputserpentis</i>
<i>maculifera</i>	<i>bistrinotata sublaevis</i>
<i>mauritiana</i>	<i>goodalli goodalli</i>
<i>isabella controversa</i>	<i>isabella controversa</i>
<i>helvola</i> sp.	<i>helvola</i> sp.
<i>mappa admirabilis</i>	<i>irrorata</i>
<i>schilderorum</i>	<i>schilderorum</i>
<i>vitellus</i>	

Additionally, the following are some of the few shells that we either found during our trip or were seen in the Pitcairn Museum:

<i>Conus omaria</i>	<i>Spondylus</i> sp
<i>Conus</i> cf. <i>episcopatus</i>	<i>Spondylus linguaefelis</i>
<i>Conus</i> cf. <i>tahitensis</i>	(seen in the museum)
<i>Conus miliaris</i>	<i>Pecten pallium</i>
<i>Conus tulipa</i>	<i>Pecten</i> sp. (2 species)
<i>Conus ebraeus</i>	<i>Haliotis pulcherrima</i>
<i>Cerithium</i> sp.	<i>Cassis</i> cf. <i>bullae</i>
<i>Conus sponsalis nanus</i>	<i>Fusinus bountyi</i>
<i>Conus chaldeus</i>	<i>Bursa ranelloides</i> ssp.
<i>Tridacna squamosus</i>	<i>Engina</i> sp.
<i>Tonna perdix</i>	<i>Latirus nodatus</i>
<i>Turbo argyrostoma</i>	<i>Chicoreus laqueatus</i>
<i>Drupa elegans</i>	<i>Harpa goodwini</i>
<i>Drupa morum</i>	<i>Balcis</i> sp.
<i>Nerita</i> sp. (2 species)	plus others
Limpets (2 species)	

What is somewhat striking is the affinity these lists have with French Polynesia and to a lesser extent Hawaii. This is reinforced by conversations we had with one of the local divers. In the 1990s, he and others trapped lobsters off Bounty Bay in 40 to 60 fathoms. The catch was transferred to lobster pots in 20 meters where they

were held and tended pending sale to passing ships. The lobster trapping was abandoned in the late 1990s when the volume of the catch fell below economic levels. Various shells came up as a byproduct of the catch. He was able to show us such deep-water specimens as *Fusinus galathea bountyi*, various *Bursa* and a few *Harpa goodwini*. All the shells were in fair to poor crabbed condition.

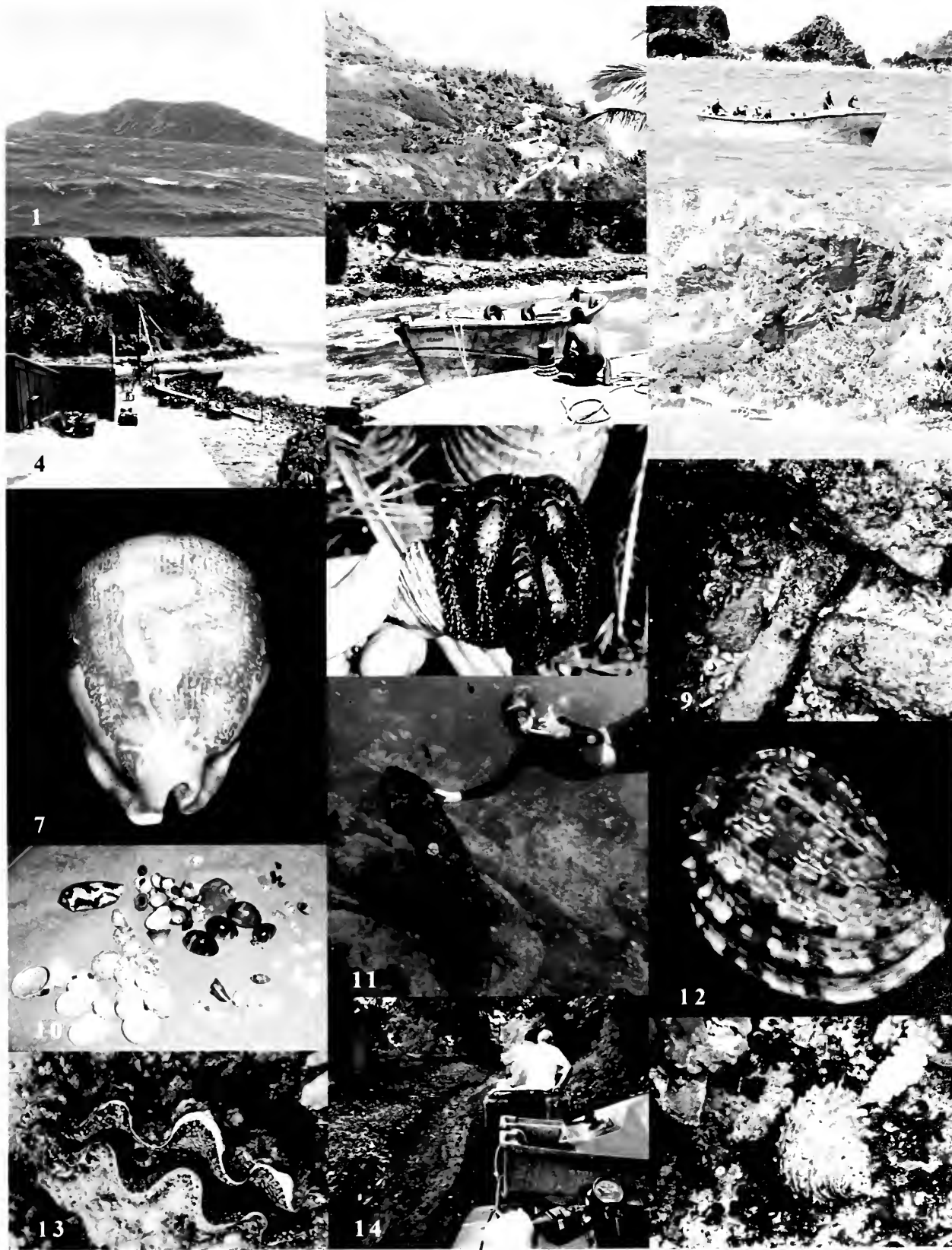
While the Pitcairn Islanders do dive to spear fish, they normally do not dive deeper than 20 meters for safety reasons. They do not actively collect shells as they do not assign any value to them. At times, they do search tide pools in the vicinity of Bounty Bay at night at low tide in search of bait for fishing. Occasionally, intertidal specimens such as *Cypraea caputserpentis*, *maculifera* and *mauritiana* are encountered and collected as decorative items. All are very rare.

An interesting exception occurred in 1994 when the son of the family with whom we were staying was tending the lobster pots at 20 meters as mentioned above. During the dive he spotted and collected a live, 96.3mm *Cypraea mappa admirabilis* adjacent to one of the pots. It is an exceptional specimen that had been in the family since it was collected and it is believed to be the only *mappa* collected by an Islander. It is now a prized specimen in the senior author's collection (Figure 7). While diving in West Bay, Pitcairn Island, the senior author found a live *Cypraea helvola* and a live *schilderorum* under a very large boulder at 50 feet. The junior author found a live *C. helvola* at 55 feet at SE Point, Henderson Island. Both *helvola* have very dark dorsums as opposed to the lighter dorsums normally seen in *C. callista*. This was the only live *C. schilderorum* found on the trip, but they were plentiful as beach specimens at Henderson Island. At Henderson Island, we were able to spend a couple of hours combing the beach drift at the NW anchorage site. In addition to *Cypraea schilderorum*, we found several *Cypraea goodalli*, two of which were in excellent condition, three *C. irrorata*, and a number of *C. isabella controversa* and *C. caputserpentis*. The *C. bistrinotata* was found fresh dead at 35 feet. Unfortunately, the *Chicoreus laqueatus* that the junior author found (crabbed) disappeared from his BC pocket. What a disappointment! Many other species of other families were also collected, including several *Haliotis pulcherrima*.

So, is the trip worth the time and effort? If the purpose of the trip is four dives a day, spectacular drop-offs, beautiful coral and a suitcase full of shells to add to your collection, the answer is no. On the other hand, if the purpose is to have a great adventure, enjoying very

different, interesting and contrasting above and below water ecosystems, adding a few nice specimens to your collection and, above all, sharing for a few days the lives of the open and very friendly Pitcairn Islanders, then it is most certainly worth it.

Plate 1, Figures 1-15 (1) Pitcairn Island (2) Adamstown, Pitcairn Island (3) Longboat at Pitcairn Island (4,5) view of landing area, Pitcairn island (5) Dock at Pitcairn Island (6) Landing area at Pitcairn Island (7) Duffy's *Cypraea mappa admirabilis* (8) Henderson Island land crab (9) *Bounty* remains off Pitcairn Island (10) Henderson Island beach collection (11) Anchor from Pitcairn Island wreck (12) Don's *Harpa goodwini* (13) *Tridacna* at Henderson Island (14) Pitcairn Island transport (15) *Turbo argyrostoma* at Henderson Island. →



Editor's Note: A Record for *Agathotoma (Agathotoma) quadriseriata* (Dall, 1919) Corrected

In a paper in *The Festivus* by Shawn Wiedrick (XL (3): 37-38, 1 fig.), it was stated that a new record for *Agathotoma quadriseriata* was from a reef east of Cahuita in Limón Province in Costa Rica, which placed this eastern Pacific species in the Caribbean.

The collectors of the specimen in question, Eugene Coan and Robert Hollywood, have clarified that the shell was collected in 1986 from beach drift on the Pacific side of Costa Rica along the northern shore of the Golfo de Papagayo.

The San Diego Shell Club's Website

Thanks to the efforts of Web Manager Bob Dees, the Club has a beautiful, colorful and informative website at <sandiegoshellclub.com>. As very new members, Bob and Van Dees came to their first monthly meeting late last year and Bob happened to mention that the Club's website was outdated. And it was, by about three years.

It was at that meeting that Bob volunteered – with no previous experience in building websites – to create a new website for the San Diego Shell Club. He got right to it and in no time at all we had the beginnings of an exciting site. Now it is totally up-to-date and with much valuable information.

The latest addition to the site is the list of the complete holdings of the Club's library. Just look under

"library" in the column at the left. Now the listing will stay current by adding any additions to the library as they are purchased or donated.

In addition there is a link to "Societies and Resources" which lists organizations, literature etc. of interest to members and others. If you have an organization which needs to be added, contact our webmaster. His address is listed under "Contact us."

Under "Club meetings & annual social events" you will find information about the Club's Mission Bay Survey Project and under "Festivus contents" is listed the titles and authors of articles published throughout the current year.

Are we proud of our website? We certainly are. Take a look and find the many other topics shown.

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